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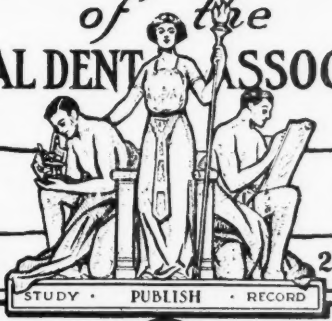
The JOURNAL of the NATIONAL DENTAL ASSOCIATION



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JANUARY, 1920

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Local and General Anesthesia.—*Puterbaugh.*

Response to the Address of Welcome.—*Buckley.*

Coordination in Laboratory and Clinical Instruction.—*Blackwell.*

Teachers and Teaching.—*Thornton.*

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Dentistry and Scholasticism.—*Editorial.*

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DR. WILLIAM WELLINGTON BELCHER.
1866—1919.

THE JOURNAL
OF THE
National Dental Association
VOL. 7 JANUARY, 1920 NO. 1

Original Communications.

PRESENT DAY PLASTIC OPERATIONS OF THE FACE.

By Major H. D. Gillies, Medical Corps, British Army, Queen's Hospital, Sidcup, England.

(Read before the National Dental Association at Its Twenty-third Annual Session, New Orleans, La., October 20-24, 1919.)

YOU cannot imagine with what pleasure I received the invitation of your wonderful association to come to New Orleans to read this paper. All my expectations of the wonders of your country have been fully realized, even in this very hurried trip. Many of you, I have got to know and like during the war on the other side of the Atlantic, so that the characteristics of professional men from all parts of your continent are known to me. The delight of your company is no new thing to me. There is one of my expectations in which I am slightly disappointed. It mattered not where a surgeon or dental surgeon came from because each one claimed that his was God's country. One of my English colleagues in reply to this said that he wasn't quite sure God had ever even heard of, I think it was, Atlanta.

In our short span of life, we cannot help greatly in the elevation of the art of our professions; but, should we, by force of circumstances, stumble across something new, something progressive, it behooves us to ventilate the deductions, to leave an antemortem legacy to our professional successors, upon which future progress may be built. The principles on which our life's work for the health and happiness of the community depends, precludes the patent-

711.14.

ing of any such discoveries. We must speak out without hesitation.

It is with these thoughts in mind that I venture to accept your wonderful invitation to me, and that I now dare to present to you a paper demonstration on plastic operations of today.

The subject is so wide and crowded with such detail that I could readily fill the time allotted with any one division of the work. While surveying the whole subject of facial surgery, both civil and military, it is hoped to include details, as many as may interest you, as few as might bore you. Every disfigurement has its disability, physical or mental, and it may safely be asserted that few of either the lay or medical public realize the extent of such disablement. Disfigured people, both male and female, have made good in life over difficulties which have overwhelmed the less strong minded. Quite apart, yet directly arising from, the military phase of this work, relief of the average deformities of the civil population can surely be vouchsafed; and as it is realized by all that disfigurement disables the individual and to a small extent lowers the efficiency of the community, more attention will be paid to a subject, the importance of which increases with the ever widening field of successful surgery.

Restorations of Region of the Face.

I. The Forehead.

Beginning at the upper part of the face, the forehead is the seat of various tumors and of scars, the result of accidents or burns. In gunshot injuries of the forehead, the skull may be involved, and a defect of the dura mater and of the contour may result. In plastic surgery, the forehead is frequently used to provide skin for other parts of the face, and the treatment of this secondary disfigurement becomes an important one.

Apart from the cases with bone and contour defect, the problem is one of providing a skin covering to a raw area caused by excision of the scar or tumor, or by the elevation of the flap, as in rhinoplasty. The smaller raw areas are closed by approximation, the scalp being freely undercut, if necessary. When the defect is moderate, an advancement of the scalp can be made by curved or inverted "V" incisions in the hairy part, communicating with one end of the defect. For large gaps, this method is not suitable, as it brings the hair line too near the eyebrow. Recourse is had, therefore, to a Wolfe graft. It may be said, with safety, that eighty to eighty-five per cent of these grafts are successful when the forehead wound is not septic. Furthermore, fifty per cent of them will unite as would a flap, with primary union between the adjacent skin edges, while the remainder show small patches of superficial necrosis, which soon epithelialise.

Technic of Wolfe grafting: A tin plate of the area is cut to the exact size and laid on the arm, forearm, and chest. The skin is marked and incised, corresponding to the exact shape, but is cut slightly larger according to the tension of the skin. The aim is to cut one of such a size and shape that when it is sewed into the forehead, the *tension* of the graft will be even, and equal to the normal. This is one of the cardinal principles on which the success of the graft depends. The tension keeps the minute vascular spaces of the skin open to aid in the early nutrition. Pressure with fixation is important for the same reason, but it has a more definite function in the prevention of fluid collections. On the forehead, pressure is applied by the dressing, thus; tin foil is laid next the graft, then a layer of dental composition, which, applied warm, makes even pressure while an ordinary gauze roll bandage, applied for some five days, completes the dressing. In Wolfe grafts of the nose, cheeks, or lips, the fixation is more complicated and usually requires the provision of a dental splint bearing suitable arms. These should be well

designed and tried out before the operation.

II. The Eyebrow.

This region, being a prominent portion of the facial contour, is frequently involved in burns or gunshot injuries. With the latter, there is usually some loss of the underlying bony ridge. Congenital deficiency, as in albinism, is not uncommon.

The mastoid graft: For the simple burned type, a whole thickness graft from the scalp about the mastoid process would appear the most satisfactory. Care is taken to include the hair follicles without doing them injury. That from the right mastoid is applied to the right eyebrow, and from the left, to the left. The hairs in their new position do not grow from some two to three months, when they commence to sprout in the right direction. Fewer hairs than were transplanted grow at first and allowance can be made for some of the hair follicles dying in the process. The writer has attempted this operation in a congenital case. The patient, being hairless thruout his body, recourse was had to his brother's scalp, without success. The blood group reactions were I. and IV.

In gunshot injuries, there is usually an accompanying loss of surrounding skin and underlying bone. A pedicle flap from the corresponding side of the head is made and swung into position. The base of this flap is in the region of the zygoma, and contains the superficial temporal artery. The extremity of this flap contains hair, which, when grafted to the eyebrow, will grow in the right direction. The pedicle is cut off in fourteen days and returned to the scalp.

For losses of bony contour and skull defects in this region, cartilage is more easily fashioned to meet the requirements of contour, but an osteo-periosteal graft gives a more efficient skull closure.

III. The Eyelids.

Deformity of the eyelids is usually attended with grave functional disability, rendering its cure the more imperative. Burns and other accidents, tumors, and gunshot wounds all cause deformities of the eyelids. Cases of ectropion are among the most distressing conditions, fortunately giving the most satisfactory repairs. They are cured cosmetically and functionally by the writer's "Epithelial Outlay Operation", described in the proceedings of the Ophthalmological Society of England (May 1918). It is merely a very efficient way of skin grafting the lids.

For gunshot injuries, the eye being usually lost, any operation is purely a cosmetic one to enable an artificial eye to be worn. Double epithelial flaps, with cartilage, are mainly used.

IV. The Cheeks.

The same traumatic and tumor deformity is met with in the cheek. When the defect is small, excision and resuture is practiced; when large, flaps are resorted to. In the severest class of defect, the new skin should be drawn from parts other than the face. When local skin flaps are used, the cosmetic result is usually good. Skin from the forehead, as in the temporal artery flap, gives a pleasant result, while the writer's retro-auricular flap, including the skin of the back of the pinna, gives a broad pedicle flap for replacing large portions of the cheek. In scar excisions, care is taken to remove all fibrous tissue, superficial and deep, and to build up the contour with neighboring tissue flaps, with free fat or cartilage grafts.

Technic of local tissue flaps: The mere excision of the scar, combined with resuture in a moderately depressed area is not sufficient in itself to produce a satisfactory result. Tissue flaps from the neighborhood are undercut and rolled inwards towards the center of the depression. In the usual case, this is

LOWER
EYE LID
PLASTIC.
OPERATIONS BY
MAJOR H D GILLIES
QUEENS HOSPITAL
SIDCUP
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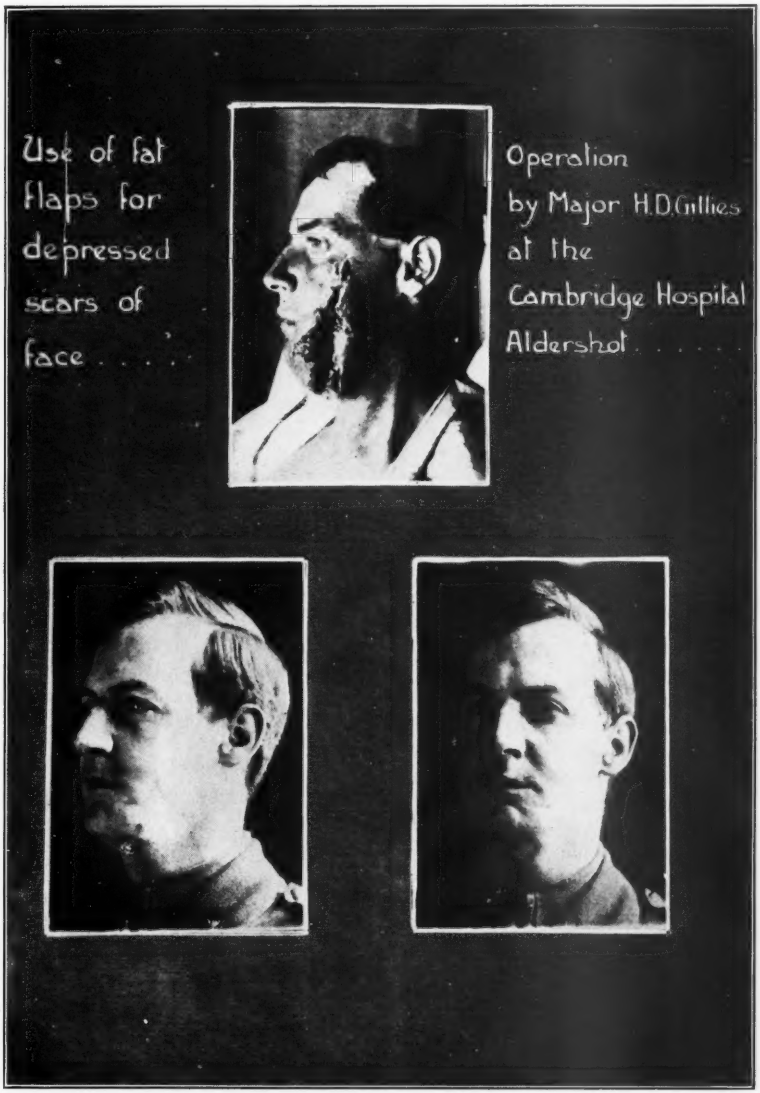

Use of fat flaps for depressed scars of face . . . .
Operation by Major H.D.Gillies at the Cambridge Hospital Aldershot . . . . .

done by undercutting the skin edge primarily for half an inch away from the incision. The knife is then carried deeper into the subcutaneous tissues and then directed back towards the wound. A flap of tissue is thus freed from the prominence on each side of the depression, and, when rolled into the center and sutured there, gives a prominence where the other had been. Care must be taken not to injure the facial nerves in this process. When the base of the underlying tissue flap is bony, as over the malar region, it is better to leave the tissue flap attached to the skin flap and roll it inwards on its superficial attachment. The latter method was described by Aymard in the Lancet, 1917. The two tissue flaps are united by deep catgut sutures. The essential part of the treatment of a depressed scar of the face lies in the manipulation of these tissue flaps. The skin is now accurately approximated with horsehair. The success of Wolfe grafting being established for large areas on the forehead, and for whole noses, the writer is now trying out large, replacements by this method. Fixation difficulties here present themselves as the chief factor in failure. Two burn cases, involving large cheek areas, have been so treated, one with almost complete success, and the other with almost complete failure.

For losses of contour in the malar region, the temporal muscle flap is the best foundation on which to build the restoration.

By means of flaps or grafts, large disfiguring naevi can be replaced with satisfaction.

V. The Nose.

Both the accidents and diseases, which cause nasal deformities, are numerous. In the former class, gunshot wounds, motor, and flying accidents, and burns are of common occurrence, while the destruction is partial or complete following lues, lupus, rodent ulcer, epithelioma. Grotesque deformities occur in rhinoscleroma, rhinophyma, and in arrestive and exaggerated nasal development, the smaller tumors represent difficulties in proportion to the raw area of their excision.

Under rhinoplasty is included any reconstructive operation on the nose, but the term is usually limited to repairs involving flaps.

1. Simple excisions of tumors and scars may be practiced, together with immediate suture in only a limited number of cases, on account of the fact that the skin over the nasal prominence is tense and does not readily lend itself to stretching across gaps, without causing deformity.

2. *The Wolfe graft* has proved itself satisfactory as a skin covering to the nose in all cases in which the bony and cartilaginous support of the nose is intact. Its color, when grafted, does not compete with the forehead flap skin, but its advantages in many cases outweigh its disadvantages, especially in that no secondary facial scar is produced. In cases of inflamed burns, the forehead being involved, this is the procedure of necessity. Small grafts, both Wolfe and Thiersch, have been used to advantage over minor plastics of the tip and alae. They lack, however, the body and contour given by a flap.

3. There is a very definite class of nasal deformity usually arising from direct blows, which cause a saddleback depression. The skin is usually intact, and the tip of the nose is very slightly tilted. The nasal bones and septal supports are crushed together. In the early stages, every effort to restore these displaced fragments into position should be made by elevation and retention with splints. The writer prefers to use the upper teeth as a fixation point for any appliance. In the later stages, the nasal bridge, which has been deflected to one side without much crushing in of the bones, may be freed and straightened

with ease; but not so those that are crushed severely. Disappointment is liable to occur if promise is made of a restoration by simple intranasal elevation. It is preferable to insert a shaped strip of cartilage to create a new bridge line, rather than to attempt the refracture. One case of arrested development of the nose was similarly treated by cartilage implant.

4. Rhinoplastic operations differ according to the extent and location of the lesion. When the upper quarter of the bridge is destroyed, there is usually a coincident loss of eye. The mucous membrane element being here negligible, the support is obtained from the glabella by an osteo-periosteal flap, which, after being turned down, borne outwards, is fixed to the freshened bone of the nose. A free implantation of rib cartilage is preferable, but care must be taken to keep out infection from the nasal cavity. The covering flap is swung down or advanced from the forehead. When the whole of the bony bridge is destroyed, as is seen in the bird-beak deformity, the communication with the nasal cavities is large and requires shutting off by a well designed flap, whose skin surface turns inwards. In this part of the nose, it is sometimes possible to graft turbinates or portions of the septum into the defects so as to bring about a closure with natural mucous membrane lining, at the same time effecting a natural support. Usually, however, the support for such defects should be of rib cartilage. The indicated piece is inserted in

(1) the in turned flap at a preliminary stage,

(2) between the two flaps at time of operation, or

(3) the late or final stage of the reconstruction.

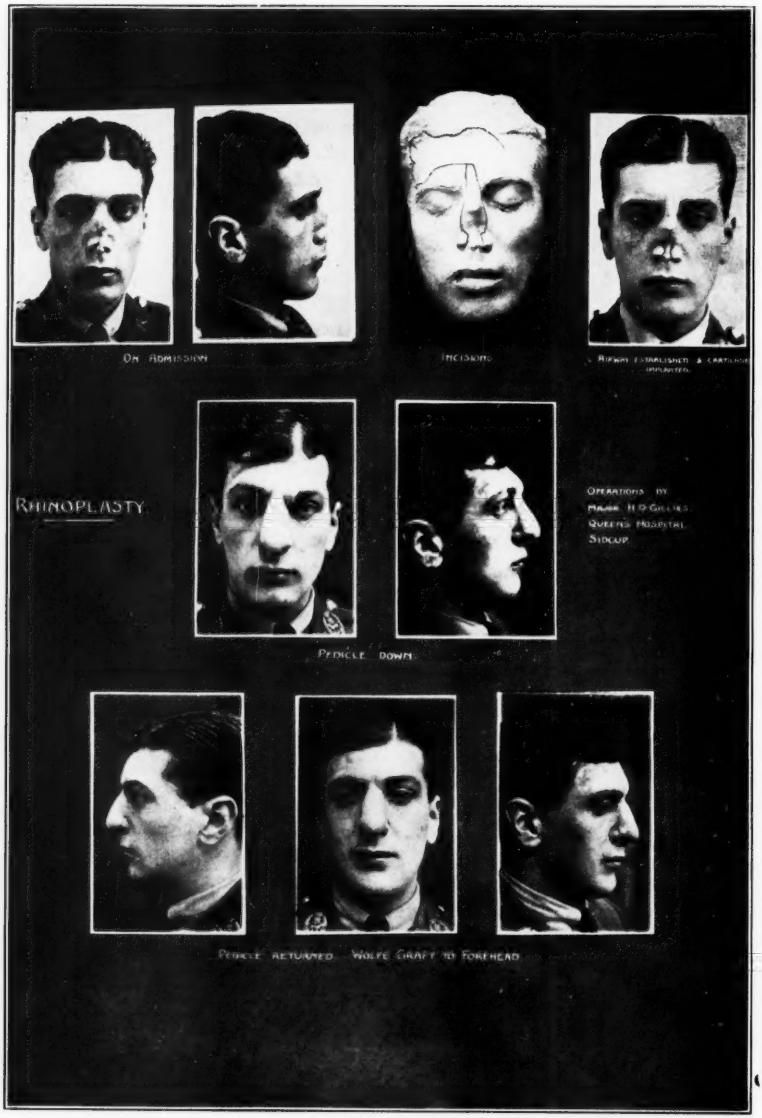
The success of the immediate cartilage implant, at the time of operation depends among other things on the thoroness with which the nasal cavity has been shut off.

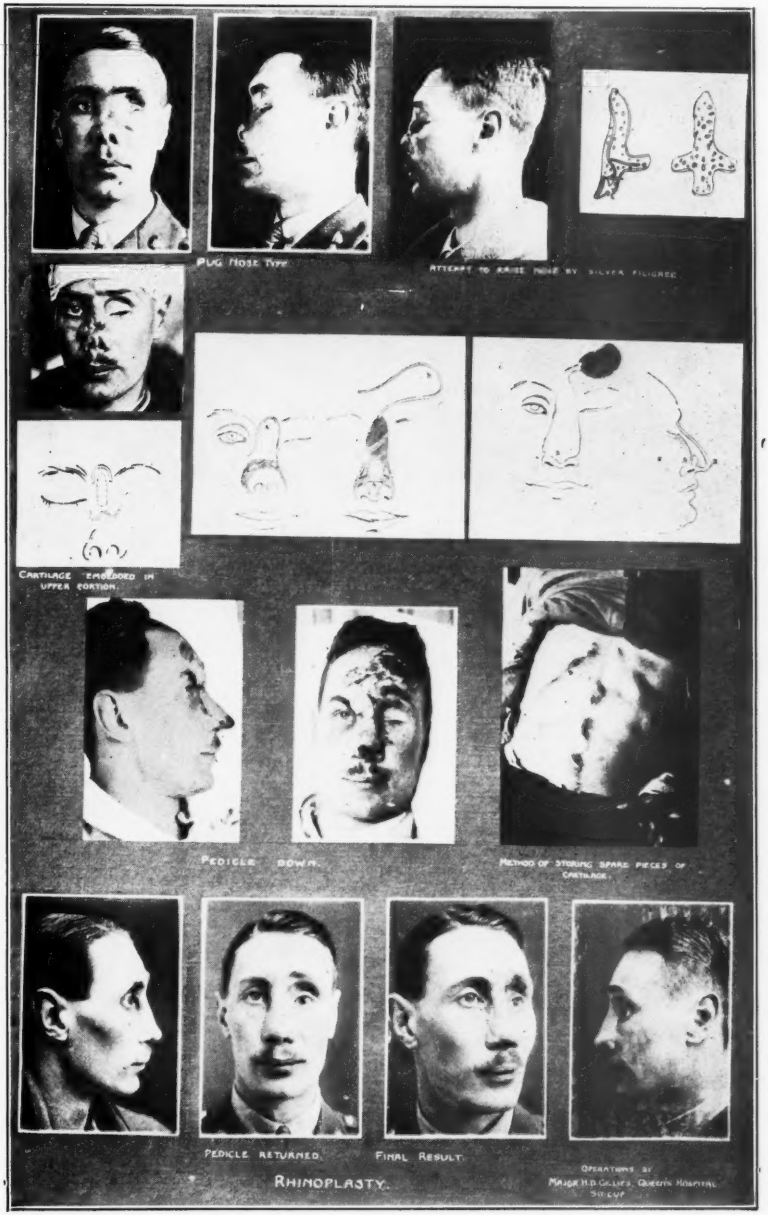
The outside covering skin is usually brought down after the Indian method, and the pedicle returned.

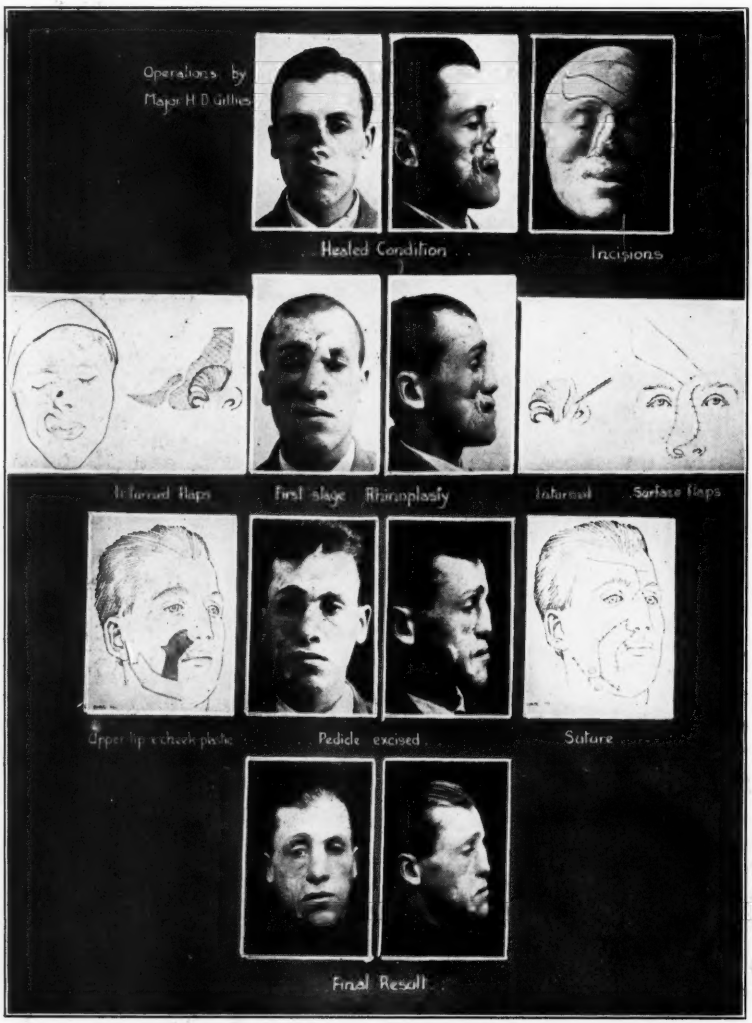
When the middle third of the nose is partially or wholly destroyed, as in a perforating gunshot injury, the tip is drawn up until the alae look directly forward, instead of downwards. For this condition, the author's operation would appear to give the best results. The technic is as follows:

The alae, tip, and columella are freed by an incision, usually thru a scar at the center of the saddleback depression. This incision is carried thru all thicknesses into the nasal cavity. Laterally, it is extended down towards the alae at the cheek attachment and centrally the septum is divided towards the floor of the nose at the columella attachment. These cuts are continued until the lower tip, including alae and columella, are restored to normal position. They are retained there by suturing skin to mucous membrane around all the cut edges, that is; along the back edge of the alae and divided septum. To enable this to be carried out, it is usually necessary to excise the free margin of the alae and septal cartilages. This simple process prevents the tip from retracting upwards during the healing process. The large aperture into the nose is now present. Thru this, any intranasal obstruction is dealt with by resection or rearrangement. The raw margin produced by the first incision is treated similarly to the back edges of the deep portion, that is to say, scar tissue is excised and enough of the cartilage and bony ring between the skin and mucous membrane removed as will allow an easy suture of this to epithelial components. No raw area should be left anywhere at the end of this operation.

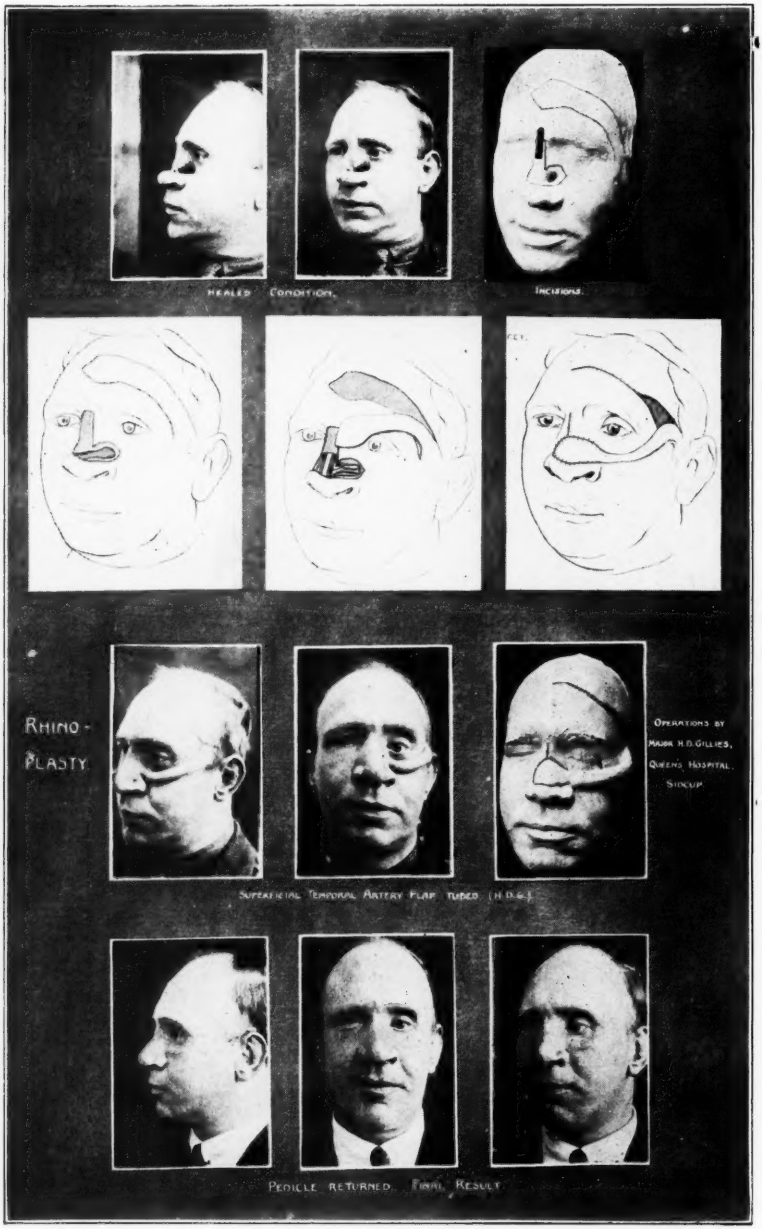
In most of the cases, cartilage from the ribs is taken in sufficient quantity at this first stage for the total restoration. A small portion of the cartilage, in the form of a straight, narrow rod, is in-

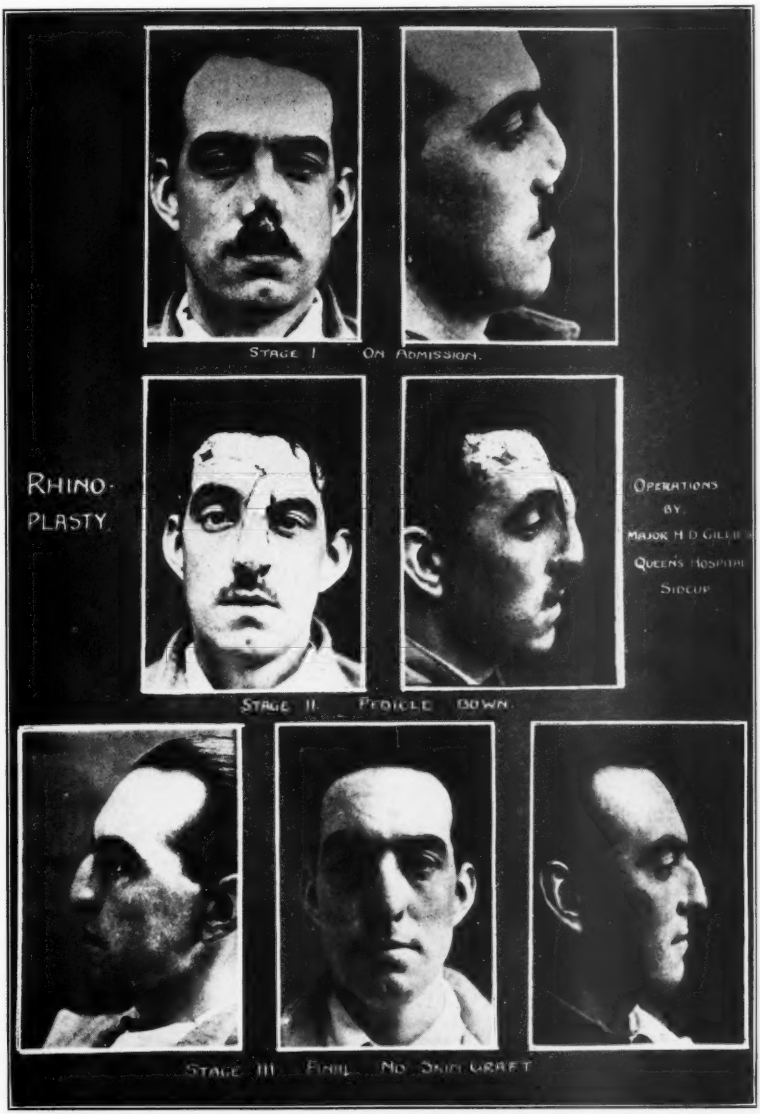

RHINOPLASTY
ON ADMISSION
INCISIONS
OPERATIONS BY
MAJOR H.D. GILLIES
QUEENS HOSPITAL
SIDCUP
PEDICLE DOWN
PEDICLE RETURNED WOLFE GRAFT TO FOREHEAD


PLUG NOSE TYPE
ATTEMPT TO RAISE NOSE BY SILVER FILIGREE
CARTILAGE EMBEDDED IN UPPER PORTION.
PEDICLE DOWN.
METHOD OF STORING SPARE PIECES OF CARTILAGE.
PEDICLE RETURNED.
FINAL RESULT.
RHINOPLASTY.
OPERATIONS BY
MAJOR H.D. GILLIES, QUEEN'S HOSPITAL
SIDCUP


Operations by
Major H. D. Gillies
Healed Condition
Incisions
Inturned Flaps
First stage Rhinoplasty
Inturned
Surface flaps
Upper lip & cheek plastic
Pedicle excised
Suture
Final Result

RHINOPLASTY
COMPLICATED BY
PARTIAL DESTRUCTION
OF SUPERIOR MAXILLA
OPERATIONS BY
MAJOR H.D. GILLIES
QUEENS HOSPITAL.
SIDCUP.
TEN DAYS AFTER INJURY
HEALED CONDITION
CARTILAGE IN FOREHEAD
EPITHELIAL INLAY BENEATH NEW
NOSE WHILE STILL ON FOREHEAD
SEEN FROM ABOVE
NOSE BROUGHT DOWN
PEDICLE RETURNED
NOSE IN POSITION
FINAL RESULT
NOTE RESULT OF FOREHEAD PLASTIC

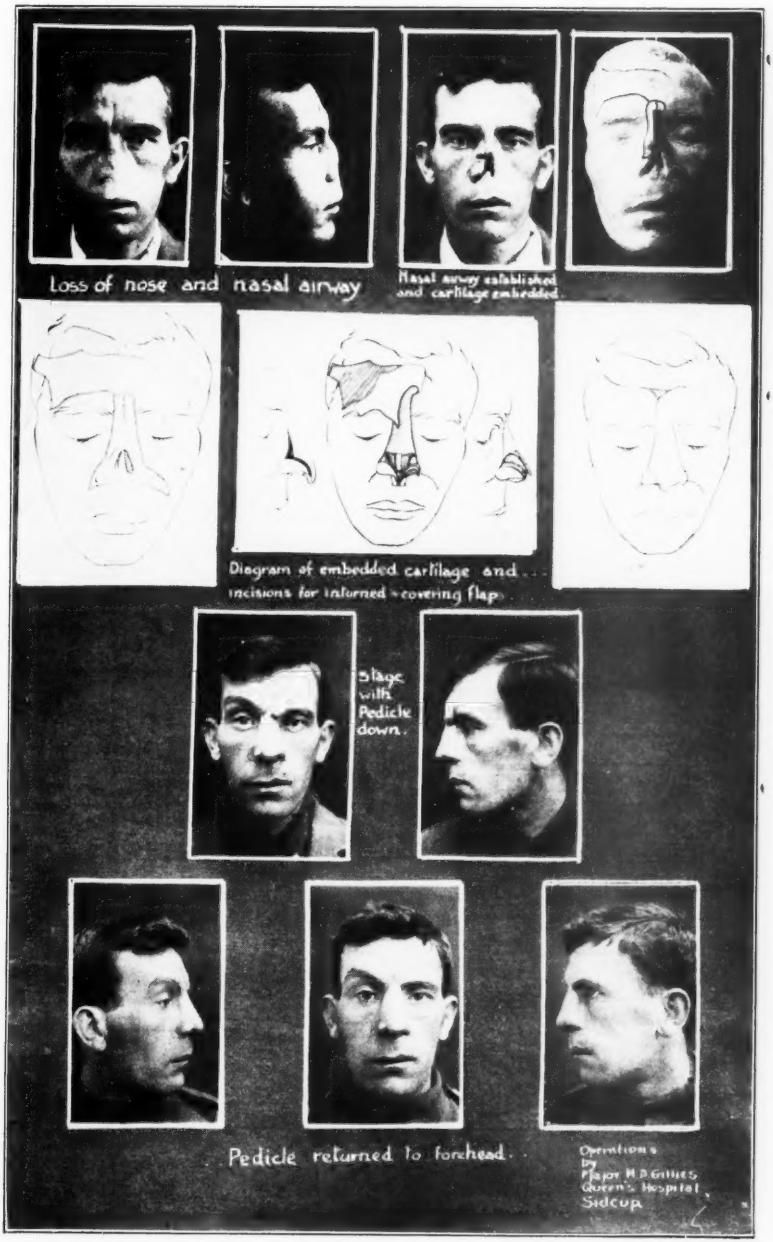

HEALED CONDITION.
INCISIONS.
RHINO-PLASTY.
OPERATIONS BY MAJOR H.D. GILLIES, QUEEN'S HOSPITAL, SIDCUP.
SUPERFICIAL TEMPORAL ARTERY FLAP TUBED. (H.D.G.)
PEDICLE RETURNED. FINAL RESULT.

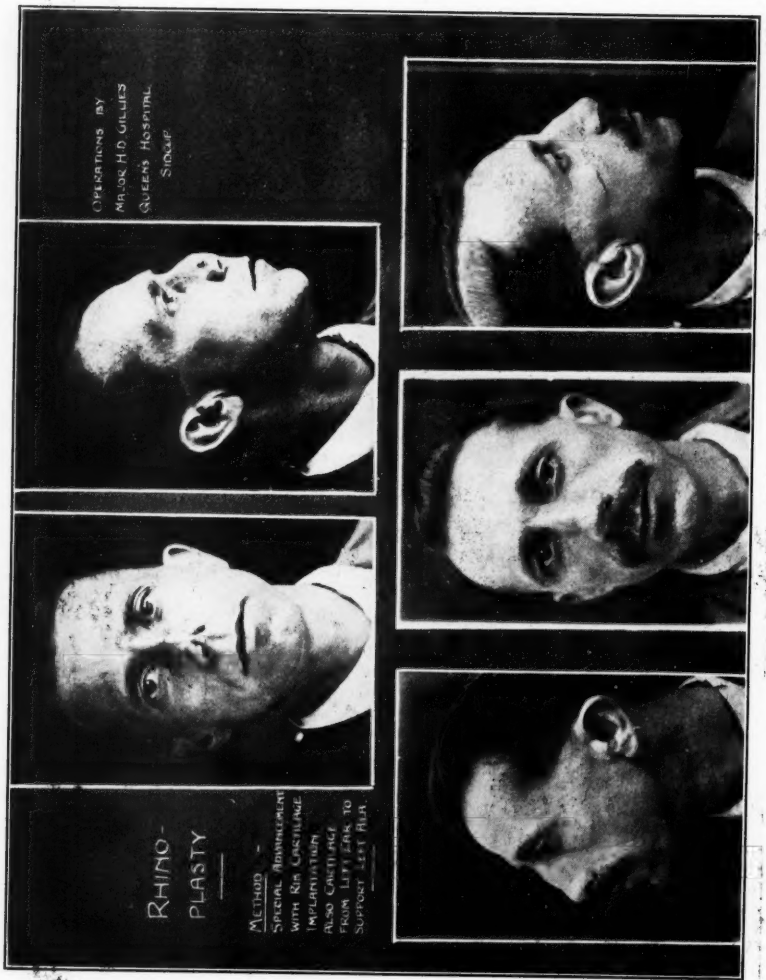

RHINO-
PLASTY.
STAGE I. ON ADMISSION.
STAGE II. PEDICLE DOWN.
STAGE III. FINAL. NO SKIN GRAFT.

CONDITION ON
ADMISSION.
RHINOPLASTY.
INCISIONS
OPERATIONS BY
MAJOR H.D. GILLIES
QUEENS HOSPITAL
SIDCUP.
FINAL RESULT.

Injury. On admission
Result after operation and wearing above appliance for two months
Operation by
Major H.D.Gillies
Final result of cartilage implantation and plastic
on alae.....

On Admission.
Healed Condition.
Rhino-
Plasty
&
Upper
Eyelid
Plastic.
Final
Operations by
Major H. D. Gillies,
Queen's Hospital,
Sidcup


Loss of nose and nasal airway
Nasal airway established and cartilage embedded.
Diagram of embedded cartilage and incisions for inturned covering flap.
Stage with Pedicle down.
Pedicle returned to forehead.
Operations by Major H.D.Gillies Queen's Hospital Sidcup


RHINO-
PLASTY
METHOD -
SPECIAL ARRANGEMENT
WITH RIB CARTILAGE
IMPLANTATION
ALSO CARTILAGE
FROM LEFT EAR TO
SUPPORT LEFT ALA
OPERATIONS BY
MAJOR H.D. GILLIES
QUEENS HOSPITAL
SIDCUP

serted in the center line about the defect. For the purposes of asepsis, it is best to do the cartilage part of the operation before the nose is attached. The assistant closes the abdominal wound and billets the spare pieces of cartilage subcutaneously in the neighborhood of the chest incision. The cartilage rod for implantation is inserted thru a small vertical incision, usually between the eyebrows, the skin being undermined as far as the margin of the defect. One horsehair suture is sufficient to close this incision, and, to safeguard the cartilage implant from the infection to which it might be exposed in the nasal part of the operation, a vaseline, light gauze packing is usually laid over the nasal aperture to prevent the two component parts of the nose becoming adherent.

An interval of some three weeks is usually allowed to elapse before the second stage, during which the cartilage implant becomes firmly adherent to the overlying skin. At the second stage, the lining of the nose is completed before the outside covering flap is cut. For this purpose, incision is made between the eyebrows and laterally to the margin of the defect on each side. The knife is carried down to the periosteum and all the tissues are raised from the ramus of the nasal bones, including the cartilage, and until the margin of the defect is reached. The combined skin and cartilage flap can now be turned inside out, the skin forming the new lining of the center portion of the nose, while the cartilage forms the support. To receive this flap, the posterior margin of the tip and alae is opened out, and, while the lining skin flap is sutured to the lining of the tip, the extremity of the cartilage is inserted into the soft tissues of the tip in the middle line. Naturally, the flap is sutured about the freshened edges of the defect. There is now a definite raw area, extending from the glabella to the skin remaining on the tip, while the nasal cavity is completely shut off. This raw area is measured by a piece of tin foil, and an exact flap from the forehead swung down in the Indian manner and sutured to the skin margins.

The third stage merely consists in the return of the pedicle to the forehead. If the flap taken from the forehead is large, the raw area there is covered by a Wolfe Graft taken from the arm. It is usually necessary to insert the second piece of cartilage over the first to produce more permanent bridge at the third stage of the operation. A veriant of this method is seen when the forehead flap is brought down on either of the superficial temporal arteries, the pedicle being tubed to prevent its infection.

The more difficult class of nasal injury includes those in which the structures of the tip and alae are destroyed. Instead of building up to a normal object, such as occurred in the previous operation, the new tip and alae have to be thrown forward into space. In addition, the finesse of the alae and the columella is one which frequently baffles the surgeon. For the smallest defects of the lobule, a Wolfe graft may be employed; for anything larger, flaps of skin from above the last portion are turned down, with their skin surface inwards to form the lining of the new alae and columella.

One of the methods employed is that described by Keegan and applicable for the small defects known as the Indian mutilation type. It includes the soft tissues of the tip.

For larger losses of the lower half of the nose, the cartilage is imbedded in the flaps destined to form the skin lining of the new parts, thus: a rod of cartilage of the correct length is inserted into the skin over the bridge above the defect. This is usually a moderately stout piece. For the support of the alae, two long, slender strips of cartilage are imbedded just under the skin thru an incision in the nasolabial line, whose upper end reaches the margin of the nasal aper-

ture. When the cartilages are firmly adherent to the skin, the three flaps are outlined, reflected with their cartilages towards the nasal aperture. An extra portion of skin of a half to three-quarters inch long is taken with the upper or central flap, which is destined to form the lining or back of the columella. The cartilage is undercut only sufficiently to allow it to come into the new position, and a certain amount of spring upwards is allowed to remain. To the anterior aspect of this flap, the two alae flaps are sutured with catgut and the three pieces of cartilage meet at the point of the nose in the form of a three-point or tripod suspension. The new right alae having been lined and supported, it remains to provide the outside covering, which is obtained from the forehead, either by the usual Indian method or by the anterior temporal artery deep pedicle flap.

The defect in the cheek caused by the elevation of the small nasolabial flap is closed by approximation. On the forehead flap, a central prolongation is made to form the anterior surface of the columella.

The third stage consists in the return of the pedicle to the forehead, together with the necessary Wolfe graft.

In regard to the destruction of the whole of the nose, the principles underlying the restoration are similar, the only difference being that sometimes the skin lining has to be provided by natural flaps and sometimes by a Thiersch graft. The difficulties are considerably increased, and the results correspondingly less satisfactory.

VI. Injuries to the Region of the Mouth.

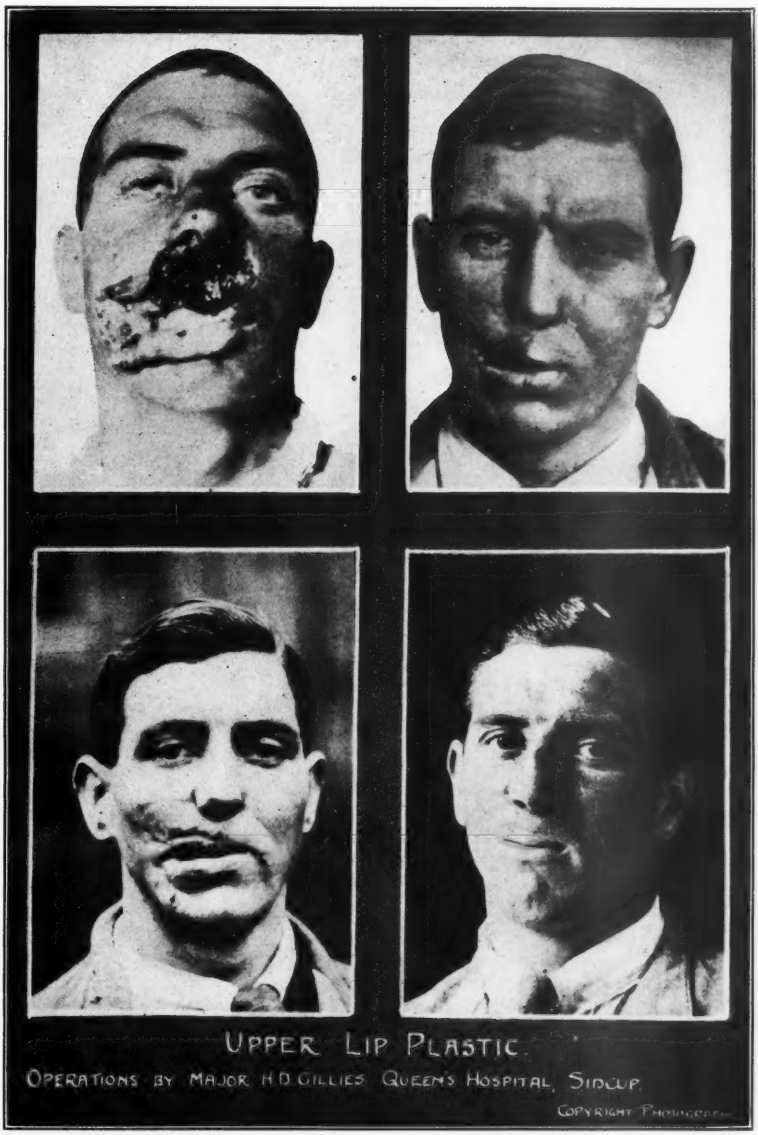
The mouth was the seat of injury in a large number of face wounds. In addition, flame burns of a severe character not uncommonly caused contractions of the lips and mouth, causing extirpation or microstomia. In civil life, a large number of well known tumors and diseases effect the lips, and, after their surgical treatment, induce conditions requiring plastic operations. This part of plastic surgery was more fully worked out before the war than that of any other portion of the face. Rhinoplasty was known for many ages, but not so fully advanced as lip plastic work.

Upper Lip.

Taking the upper lip, the principles of the repair again depend on the character of the deformity and the amount of tissue lost. For small lateral defects, the descending flap brought down from the side of the nose is of great value. When the defect extends as far out as the angle of the mouth, the ascending flap from the side of the chin is swung into position to form the upper lip. With a small central gap, both sides may be advanced without causing undue drawing together of the corners of the mouth.

For the larger defects, these methods may be combined or modified, but it is usually necessary to go farther afield to supply the loss of tissue. The larger the loss of tissue, the less musculature is present in the new lip. When the lip is made by double epithelial flap, the flap is turned in on itself, as in tubed-pedicle method from the neck and chest, or, as in the method from the forehead, no normal movement of the lip can be expected. Both the descending and the ascending flaps above mentioned, when used for the minor repairs of the upper lip, cause the corner of the mouth to be somewhat dropped. This can be corrected by a secondary operation, either in the nature of an excision, or in the nature of small transfers from above to below the angle of the mouth.

Provision must be made for adequate mucous membrane lining to this partial lip plastic. This can usually be found by an advancement of the mucous membrane already existing, and the red mar-


UPPER LIP PLASTIC.
OPERATIONS BY MAJOR H.D.GILLIES QUEEN'S HOSPITAL, SIDCUP.
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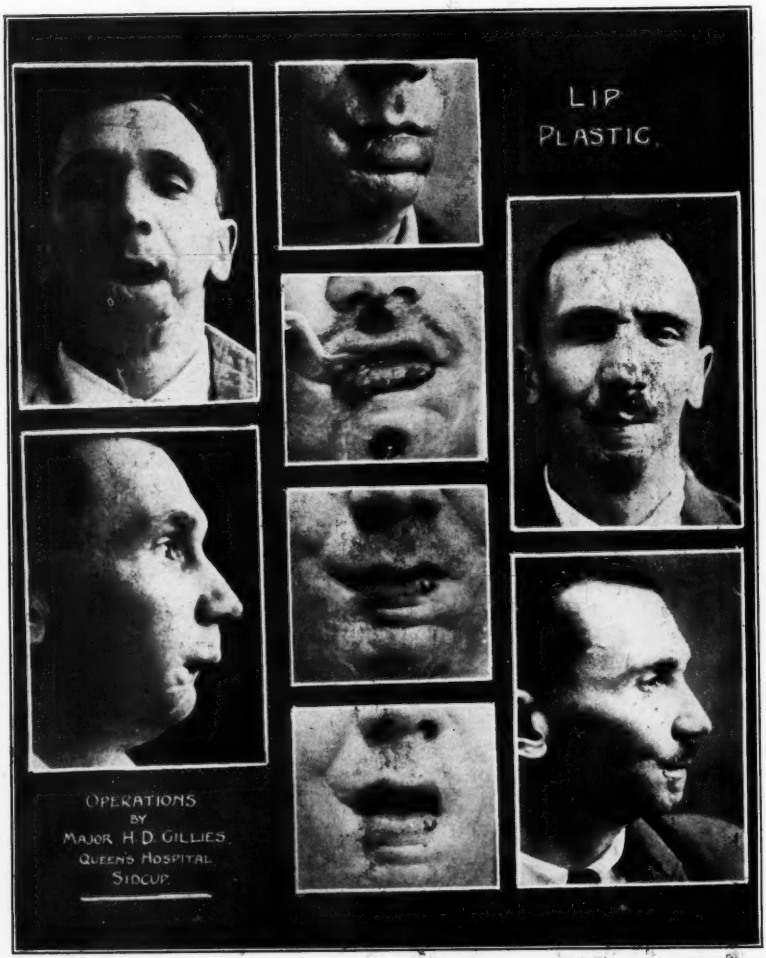
LIP
PLASTIC.
OPERATIONS
BY
MAJOR H. D. GILLIES.
QUEEN'S HOSPITAL.
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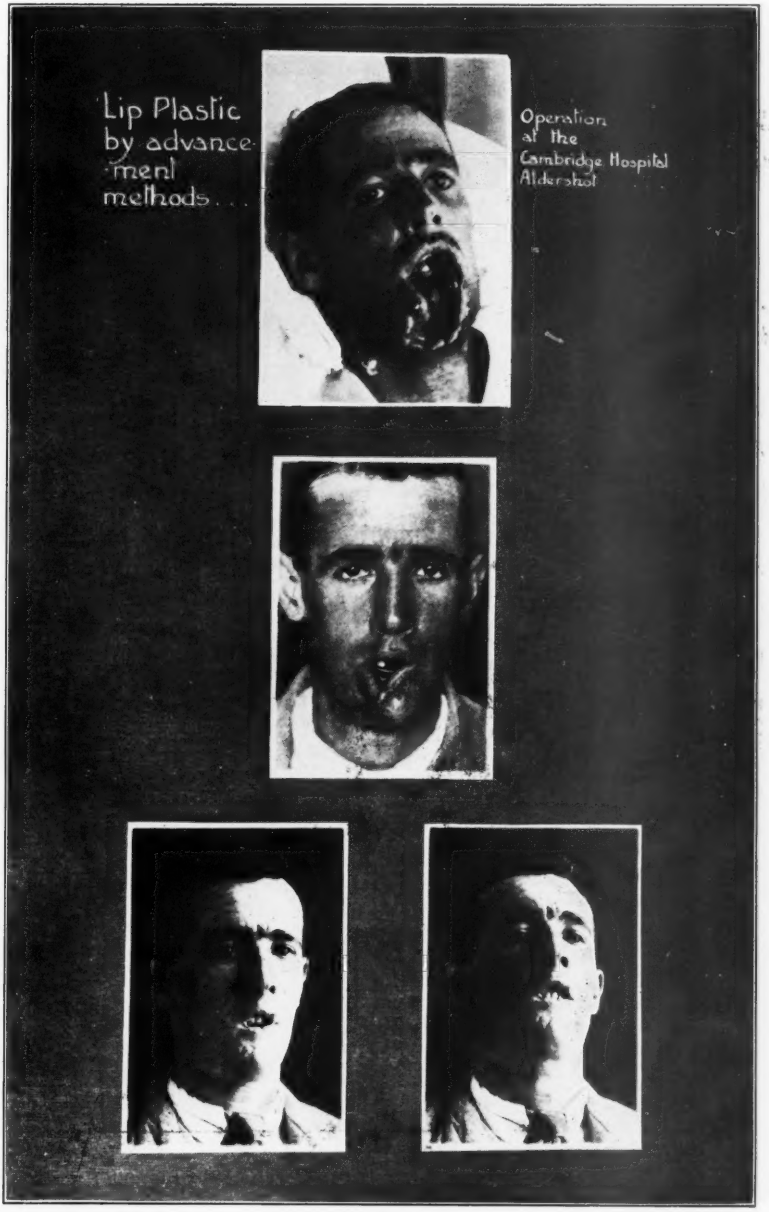
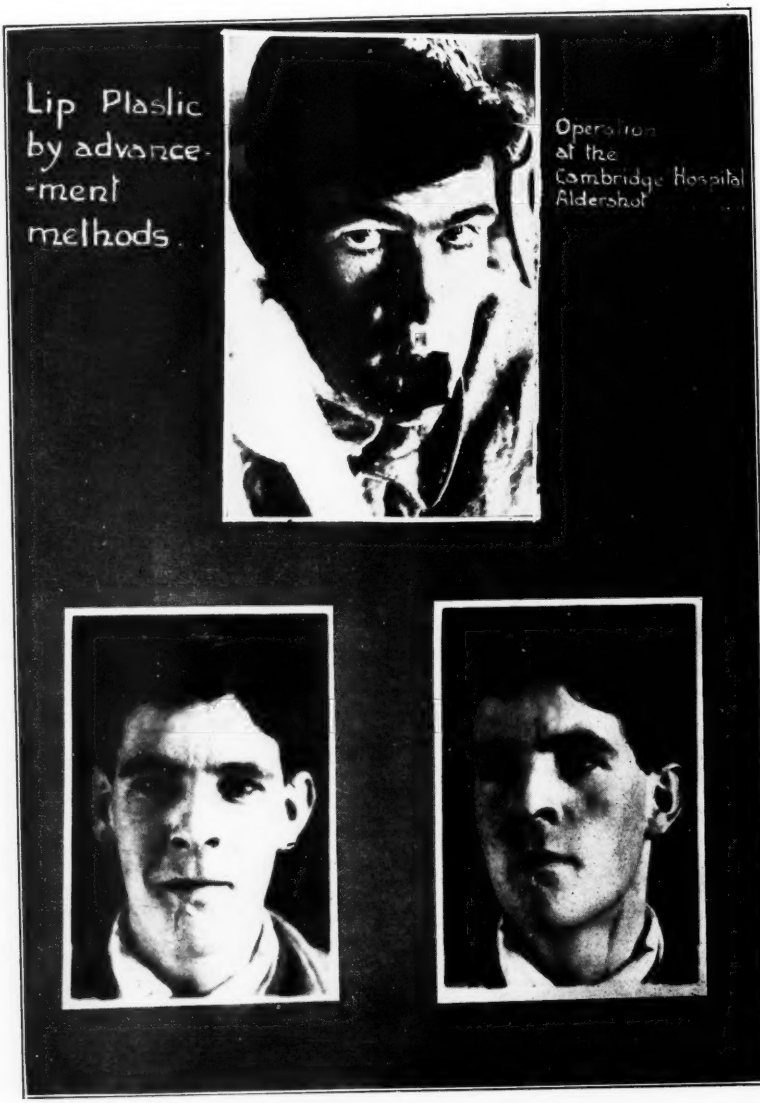
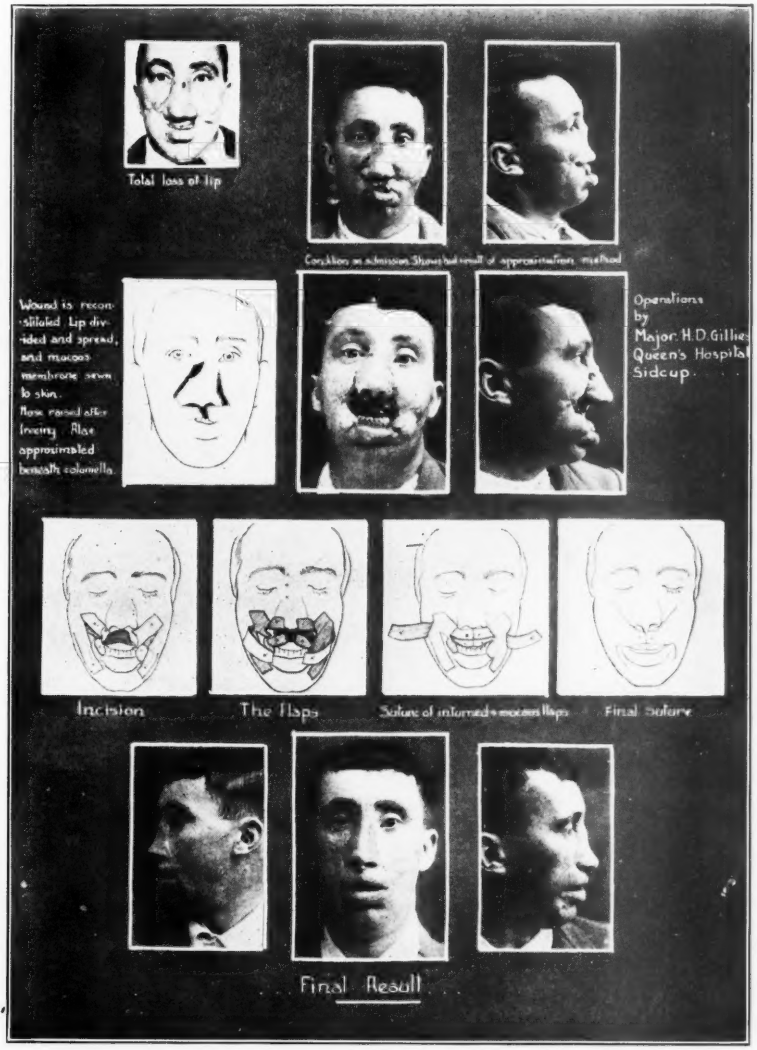
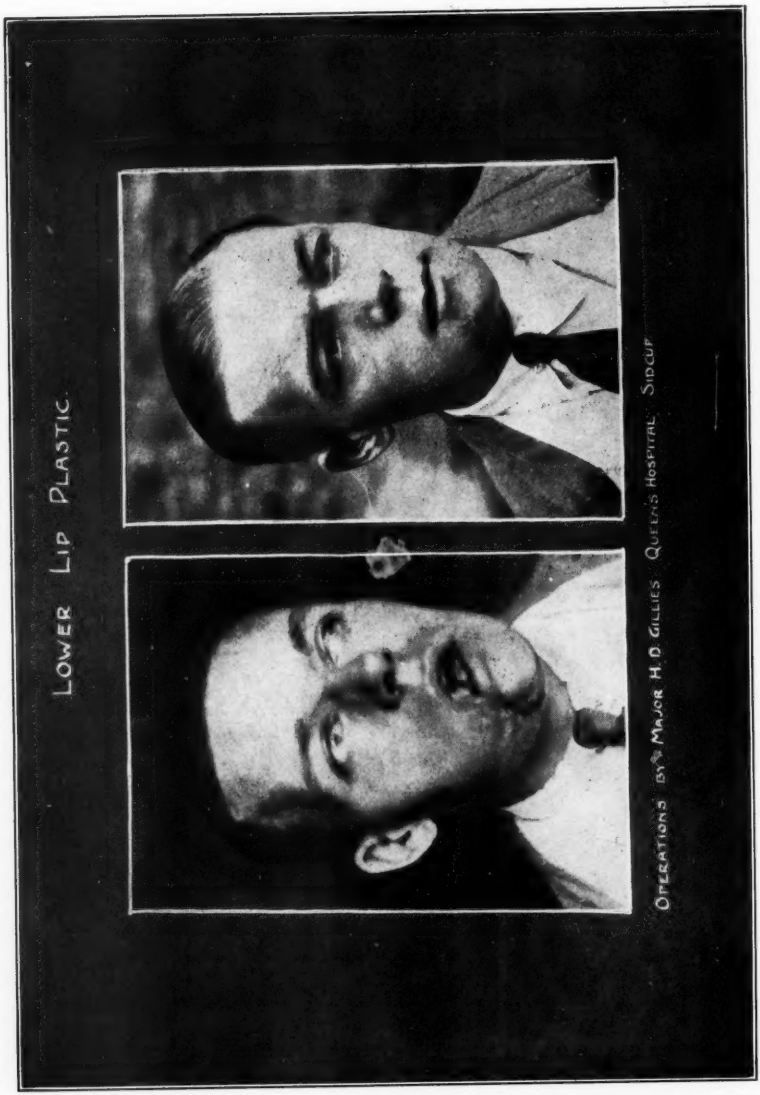

Lip Plastic by advance-ment methods...
Operation at the Cambridge Hospital Aldershot


Lip Plastic by advance-ment methods.
Operation at the Cambridge Hospital Aldershot


Total loss of lip
Condition on admission. Shows bad result of approximation method
Wound is reconstituted. Lip divided and spread, and mucous membrane sewn to skin. Flap raised after twenty days approximated beneath columella.
Operations by Major H.D. Gillies Queen's Hospital Sidcup.
Incision
The Flaps
Suture of internal mucous flaps
Final Suture
Final Result


LOWER LIP PLASTIC.
OPERATIONS BY MAJOR H. D. GILLIES QUEEN'S HOSPITAL SIDCUP

gin is similarly completed by rearrangement.

A typical example of total upper lip repair is as follows:

With gunshot injuries, there is always an underlying loss of the premaxilla. This must be replaced by a prothesis before the operation, care being taken to see that the bony contour is accurately reconstructed. The natural flaps from the cheek are now designed, which, when swung in towards the defect with their skin surface backwards, will form the lining of the upper lip. Two mucous membrane flaps are now taken from any remains that happen to be present and are sutured along the lower border of this in turned lining. Over the whole raw area so caused, an outside covering is provided from one of three areas. In the one case illustrated, two ascending flaps were brought from the sides of the chin and sutured together in the middle line. This will bear hairs suitable for a mustache. A hairy covering can also be provided by flaps brought down from the scalp on the temporal artery.

The third method advanced is the tubed-pedicle flap from the neck. With this flap, no hair is transferred to the lip, and its disability is that, the color being different, there is a somewhat marked difference between the grafted portion and the surrounding tissue. The operation is completed by sewing the other edge of the mucous membrane flaps to the lower edge of the covering flaps.

Lower Lip.

The common and proved satisfactory repair of the lower lip is outlined as follows:

With the central excision of the lip, as after the removal of a growth, the common operation is one that is made by advancing the lateral portions of the lip to meet in the middle line. To enable this advancement to take place, incisions are carried thru all thicknesses of the cheek horizontally outwards from the corner of the mouth. Triangular excision carried out above this first cut enables the advancement to be completed without puckering.

An extension of this operation is sometimes made in the form of a large horizontal "V," the apex of which is just below the lobule of the ear, one limb at the corner of the mouth and the other in the submaxillary region. The "V" is converted into a "Y" after the advancement is made.

To repair one-half of the lower lip, as is frequently required in gunshot injuries, a whole thickness, nasolabial flap is cut and swung down to make the missing portion. Frequently enough mucous membrane is found locally to complete the lining, in which case this nasolabial flap is carried down to the muscular layer only.

With both these methods, satisfactory results have been recorded in the civil cases.

Another flap that is used with success is the ascending flap from beneath the chin. Care must be taken in executing this maneuver to cut the flap almost vertically, otherwise, the gain of tissue to the lip will be partially counteracted by the secondary closure.

For total lips, a similar method to that fully described for the upper lip is available and will render good service.

The chief disability of this procedure in the lower lip is that the internal flaps usually contain hair which, without often causing any inconvenience, may be a nuisance to the patient in this situation. The tubed-pedicle flap from the neck is consequently more applicable to the lower than to the upper lip.

A quite satisfactory free border to the new lip is often obtained by this two-pedicle method, the rows of skin only being opened out in so far as it is necessary to sew it and graft it into position. It would appear that skin on the edge of a lip, which is constantly being moistened by the saliva and exposed to the

air, assumes a reddish appearance simulating the vermilion border.

A more satisfactory method of obtaining the red margin, both to this class of lip and to the lower lip made by the previously mentioned methods is one involving the transfers of mucous membrane from the upper to the lower lip. The mucous membrane from the region of the frenum of the upper lip is brought down in the form of a flap, the base of which is on the free edge of the upper lip. A bed is made for it in the suitable situation in the lower, and the two lips sewn together until the mucous membrane is grafted. The pedicle is now divided, and the stump returned to the back surface of the upper lip. No secondary disability to the upper lip is seen to occur.

In gunshot injuries, involving the buccal cavity, when mucous membrane is used to make part of a new lip, it is usually found that there is a shortage of mucous membrane in either the upper or lower dental sulci. In either case, the remedy is comparatively simple. This is accomplished by the use of an epithelial inlay. The operation as described by Esser was introduced by the writer to the Queen's Hospital, Sidcup, and modified, simplified and improved by Majors C. W. Waldron, C. A. M. C., and H. P. Pickerill, N. Z. M. C., and the various dental surgeons of the hospital.

Taking a deficiency of the lower sulcus for an example, where the alveolar margin has been shot away, it is found that no efficient denture can be fitted until after this operation. A splint, which bears a small plate overhanging the operation area, is made and fitted to the lower teeth. Mucous membrane is divided from the gum, scar tissue excised until the sulcus is fully established. An impression of the raw areas is now taken in dental composition, and made to fit in with the appliance. Over the mold of the raw cavity, an evenly cut, thin Thiersch graft is smoothed out with its raw surface outwards. The whole is now returned to the mouth, so that the graft is firmly pressed into every irregularity of the raw area. These grafts are uniformly successful, and, providing that the epithelialized cavity is kept moderately distended for a few weeks following the operation, no serious contraction of the cavity occurs.

VII. Traumatic Injuries of the Palate.

These differ considerably from the congenial variety, in that, as soon as the closure—either mechanical or surgical—is effected, the function of speaking and eating is instantly restored. An attempt should be made to close all posterior perforations of the hard palate by well known methods.

Concomitant with an anterior palatal defect, destruction of the upper alveolus on one or both sides is usually found. There is, consequently, a great difficulty in the fitting of an upper plate, which is usually made more complicated by the fact that an upper lip has been reconstructed over an appliance. Working in close cooperation with Capt. Kelsey Fry, R. A. M. C., the writer came to the conclusion that it was unwise to close the majority of these anterior defects by surgical means. A far more efficient upper plate could be fitted when the opening into the nasal cavity was utilized for fixation points on which part of the prosthesis could be securely fitted. Furthermore, a number of cases presented themselves with loss of the premaxilla, but with a reconstructed upper lip firmly adherent to the anterior surface of the maxilla. Attempts to stretch this lip forward by building out the plate produce a certain amount of improvement in contour, but usually end in a reduction in the efficiency of the denture.

The radical and correct method of treating such condition is to support the soft tissues from the hard, to bring the lip forward into normal position, and

thus create a large oro-nasal perforation. The soft parts are retained forward by a prothesis, but severe contraction will cause great difficulty in the after treatment of such a case, unless the raw areas at the back of the lip and on the anterior surface of the maxilla are efficiently skin-grafted. Consequently, at the operation, a block of dental composition is moulded into the cavity, and skin graft laid over the parts of it corresponding to the raw areas. No special retention apparatus is necessary to keep this mould in position. At the end of some ten to fourteen days, a prothesis is constructed to fit accurately into the cavity of the nose. Many complicated and interesting upper appliances which are usually made in two or three pieces, have been evolved to complete this reconstruction. It is found that an upper denture so constructed is firmer than the majority of free upper plates.

VIII Chins.

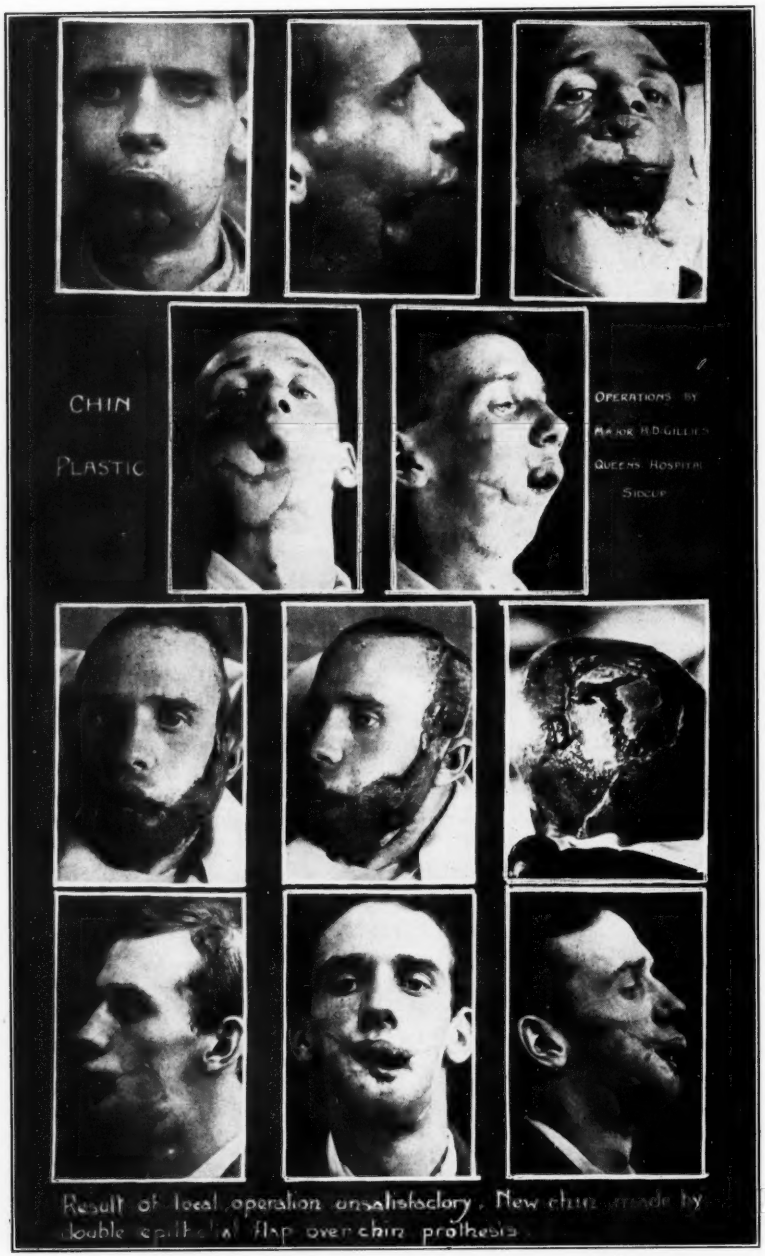
When a large piece of shell hits the lower part of the face in a horizontal direction, the whole mental process, with its overlying soft tissues and its underlying bone and mucous membrane, are shot away, the tongue presents itself above the hyoid bone. The whole of the lower lip below the corners of the mouth is involved in the destruction. This is the most distressing of jaw injuries, and the attempts at its repair are indicated below.

The other injury of the chin which is of common occurrence is that produced by flame. In this class only, the skin of the chin is involved, and the reconstruction is confined to the provision of healthy skin in place of the scar tissue caused by the burn.

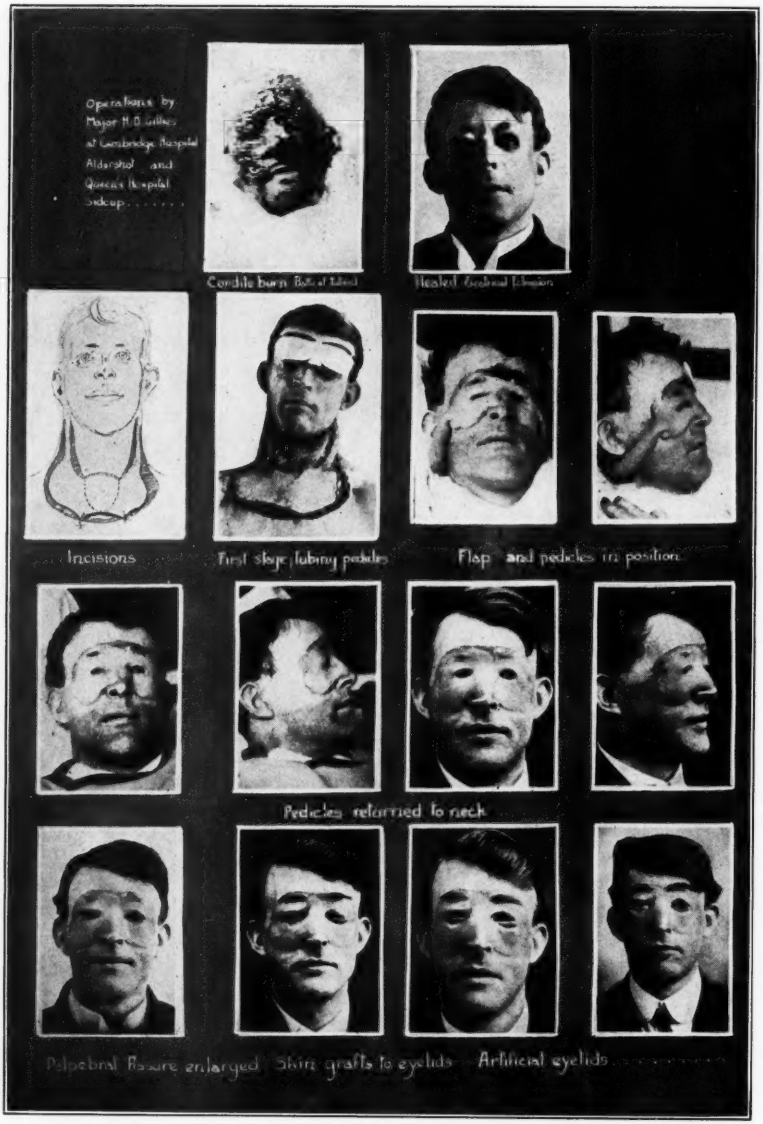
In the very severe gunshot class of injury, it is difficult to choose the method from so many different ways of making a new chin and lower lip, few of which have given complete satisfaction. The writer's most successful case was treated as follows, and a number of other successful cases of less severity have been satisfactorily dealt with on these lines.

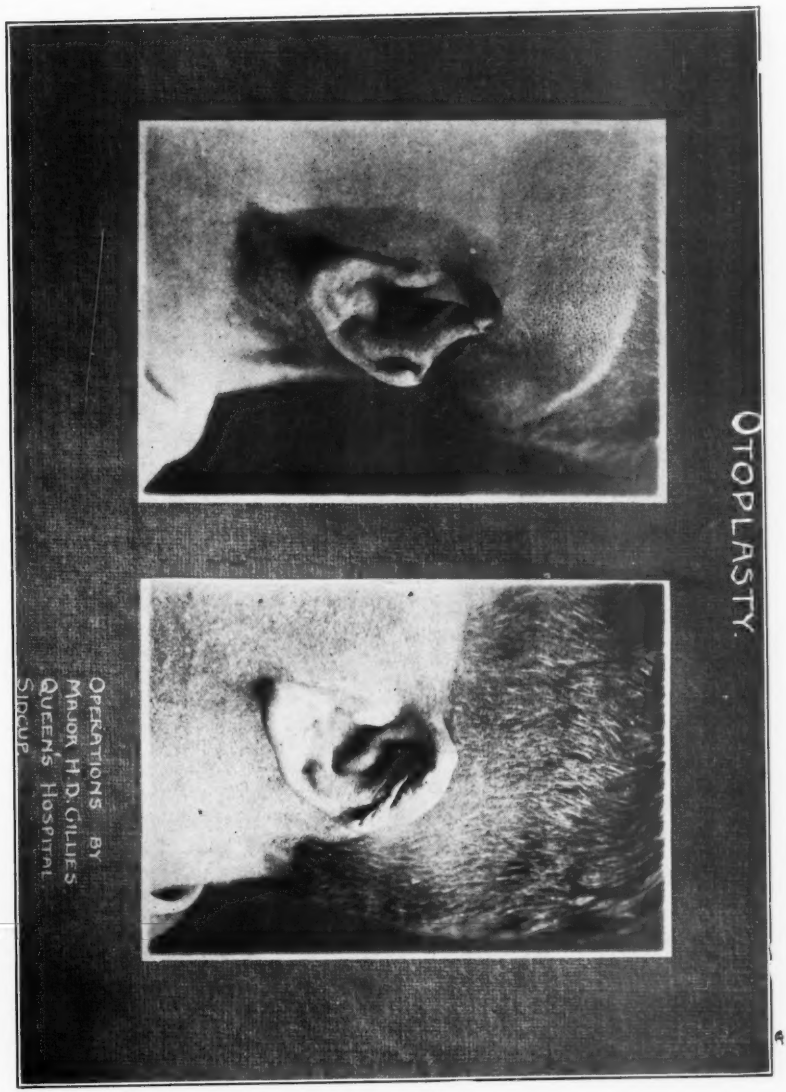
Presuming that the mandible is destroyed from one angle to the other, and no efficient appliance can be fitted onto the rami, a model chin is made by the dental surgeon, which may find its support from the upper teeth, if not from the mandibular remains. Over this false chin are built flaps of skin from the neighborhood of the defect. In the particular instance, two lateral flaps were swung inwards horizontally and sewn together to form the skin lining of the new lip, while a third flap was turned up from below the defect to cover the remaining exposed portion of the appliance. The raw area caused by the elevation of these three in turned flaps was covered by a large scalp flap swung down on double temporal, tubed pedicles; the pedicles returned to the scalp and the center portion of the vertex skin-grafted.

There were available, in this case, a small block of tissue, the result of a previous attempt at lip plastic, which was situated between the silver chin and the tongue, thus forming a partition in the reconstructed buccal cavity. By splitting this wall horizontally, a portion was brought out and sewed on each side along the upper or free margin of the new lip. An improvement was thereby made in both the appearance and function in that these small flaps contained both muscle and mucous membrane. The hair growing on the buccal surface of the chin caused little or no inconvenience to the patient, and, after a due interval, an attempt was made to graft a new mandible. The writer is strongly in favor of the use of an osteoperiosteal graft for such a huge, bony reconstruction in tissues which are new, abnormal and poorly supplied with vessels. A strip of osteoperiosteum taken from the tibia was laid in position from one fragment to the other in the sub-


CHIN
PLASTIC
OPERATIONS BY
MAJOR H.D. GILLIES
QUEENS HOSPITAL
SIDCUP
Result of local operation unsatisfactory. New chin made by
double epithelial flap over chin prothesis

Stage I. Complete facial burn (cordite)
Stage II. Tubing pedicles & portion of face replaced by large chest flap
Face
Plastic.
Operations
by
Major H.D. Gillies
Queens Hospital
Sidcup
Stage III. Pedicles detached.
Stage IV. Left pedicle swung round to make nose.
Stage V. Later. New chin, nose, cheeks & eyelids.


Operations by
Major H.D. Gillies
at Cambridge Hospital
Aldershot and
Queen's Hospital
Sidcup.
Cordite burn. Both eyes blind
Healed Orbital Excision
Incisions
First stage (tubing pedicles
Flap and pedicles in position
Pedicles returned to neck
Palpebral Fissure enlarged
Skin grafts to eyelids
Artificial eyelids


OTOPLASTY.
OPERATIONS BY
MAJOR H.D. GILLIES
QUEEN'S HOSPITAL
SIDCUP.

stance of the new chin. After four months, union was obtained with one end of the mandible, but there was fibrous union only at the other end of the graft. No observation of the intermediate portion was apparent.

Continuing the reconstruction, a second osteoperiosteal graft, seven inches by three-fourths of an inch wide was laid over the first graft and the fragments which were freshened to receive it. This second large graft was taken from the same area on the tibia, as was the first, with the idea that the regenerated bone of the tibia might be more active in osteogenetic powers. Three months had elapsed when the case was last examined and it was obvious that a firm functional band of bony union had taken place between one fragment and the other. By holding the graft at the symphysis between the finger and a thumb, considerable force had to be exerted to prevent the patient closing his new mandible in the normal manner, and the whole thing gives promise of considerable functional ability.

Another case, which has given promise of a good cosmetic result is that in which the whole forehead was swung down to form a new chin. Cosmetically, this is an improvement on the scalp method.

Other moderately satisfactory chins have been made by large chest and neck flaps.

IX. Whole Face Reconstruction.

Under this heading, the very large destruction of the face is not included, as few of these cases survived for treatment. Total facial replacements, therefore, are confined to extensive frame burns.

In this distressing deformity, the prominent portions of the face are very severely burnt, while the less exposed receive damage which is irreparable. The problem becomes one of obtaining a sufficiently large flap with which to cover the face. Recourse is had to the chest and neck for the provision of the necessary skin. It is better to repair one-half of the face at a time, thus, a tubed pedicle flap may be prepared on one side, according to the writer's method, and the chest end swung up to replace the chin. Following this, the neck end of the flap can be swung to form a nose, the pedicle divided from the nose and laid across the cheek. The remaining portions of the face are dealt with on lines similar to those already mentioned.

The writer's tubed-pedicle principal is one of far-reaching utility in all plastic operations. A strip of skin some three inches wide is raised from the neck, being left attached at each end. The free skin edges of this strip are now sewed together so that the complete tube of skin is constructed. The remaining skin under the tubed-pedicle is drawn together on each side to effect a closure by approximation. The advantages of this method are that blood supply of an increased character is induced down the pedicle to the flap extremity. The vascular and lymphatic channels in the pedicle are protected from exposure, infection, and thrombosis. Further, it is found that when the chest end of a tubed-pedicle is grafted into the face, the pedicle itself may be used with great safety and facility for the remaining restoration. It is necessary to open and flatten out the tube merely by an incision thru the junction line of the edges.

None of this class of total destruction has yet yielded a result that satisfies the writer. An enormous improvement, both in function and appearance, can be safely expected in the surgical treatment of large facial burns.

LOCAL AND GENERAL ANESTHESIA IN DENTISTRY.

By P. G. Puterbaugh, M. D., D. D. S., Chicago, Illinois.

(Read before the Illinois State Dental Society, May 13-16, 1919.)

IN A REVIEW of the proceedings of this society, one is impressed with the fact that papers upon the subject of anesthesia have been presented and discussed at almost every meeting. This leads to the assumption that altho the field of anesthesia has been steadily expanding, we have not, as yet, arrived at the ideal in anesthetics. It demonstrates that the profession as a whole realizes the need for and anxiously awaits further development in this most interesting and essential specialty of medical science.

In the onward march of dental advancement beginning with the barber and blacksmith who extracted teeth as a side line, down thru the years of evolutionary development to the complexities of modern practice, numerous methods for the alleviation of pain have been employed with varying degrees of success. Today we are confronted with a new problem—that of pulp conservation—which demands extensive cutting away of vital teeth for bridge attachments and fillings without devitalization of the dental pulp; and while we hear many arguments to the contrary, I believe it to be a fact that we are facing an era in which most teeth with devitalized pulps are to be critically scrutinized by the medical profession, while the tooth containing a vital pulp will pass without question. That being the case it behooves us to conserve the vitality of dental pulps more religiously than we have ever done in years gone by. This means that anesthesia will be demanded in operative work upon many teeth that a few years ago would have had the pulps removed prior to preparation for permanent restoration.

Much has been written upon the systemic effect of sensory nerve shock, the evil results of psychic disturbance and their lowering of bodily resistance to infections. No doubt can exist in the mind of anyone who has had the experience of having hypersensitive dentin excavated in his own mouth, that nerve shock is exhausting to say the least. It was with gratification that we read Crile's report of his experimental researches proving histologically that cellular degeneration of vital organs actually occurs in animals under conditions of pain or nervous excitation.

We are not in sympathy with the stoic who invites pain, or endures it unnecessarily in order to demonstrate his physical endurance. He could utilize energy to much better advantage than that of ruthlessly burning it up in combatting painful impressions.

Our profession must realize that anesthesia is not to be looked upon as a convenience to be used only at the request of the patient but is an absolute essential to the health of the individual who places himself under our care. Then too, all arguments to the contrary not-

withstanding, we must admit that the dread of dental operations in the average patient's mind is not one of theory or fancy, but was born in the fact that they have experienced excruciating pain incident to dental manipulations, or have been truthfully informed by someone else who has.

In looking back thru the misty haze of the centuries, we marvel at the early puny attempts to relieve pain incident to disease or surgical procedures—decoctions of mandragora and wine, hemp, essence of hyosciamus, poppy and belladonna, hypnosis, asphyxia, topical applications of ice, etc., down to Wells' historic failure in attempting to clinic publicly with nitrous oxide. Had it not been for the fact that his former pupil Morton, had faith in him altho his anesthetic was rejected by the medical profession and Wells branded as an imposter, anesthesia might have slept in oblivion for many more years. But, with Morton's substitution of ether for nitrous oxide, general anesthesia became a fact in 1846. Little more was heard from nitrous oxide for nineteen years when Colton in 1863 formed an association for the performance of dental operations under its influence in New York. Their results were so successful and satisfactory that its adoption spread rapidly thruout the dental profession and by the year 1870, (fifty years ago) its employment had become universal thruout the civilized world and nitrous oxide became the anesthetic for dentistry.

Thirty years ago the anesthetic properties of cocain were discovered Ophthalmologists were the first to employ it topically to the conjunctiva obtaining true local anesthesia. One year later (1885) Halstedt successfully used it for mandibular anesthesia, making his injection at the mandibular foramen in the same manner as that employed today. Like many men now, dentists then showed considerable temerity regarding the block injections and the general use of cocain was restricted to infiltration anesthesia at the site of operation until Braun, Fischer and others again brought to the front the conduction method after the discovery of the comparatively nontoxic novocain by Einhorn in 1905. Ethyl Chloride discovered by Fluorens in 1847 and revived in 1898 as the principal ingredient in Somnoform has had many enthusiasts practicing in high altitudes but never has become popular in Illinois.

Much improvement in apparatus for nitrous oxide administration together with the fact that pure gas is obtainable in steel cylinders, has assured it of a permanent place in the profession. The admixture of oxygen has rendered it safer as to mortality and more comfortable to the patient by preventing nausea. It provides the operator with a prolonged, tranquil, smooth anesthesia free from muscular contractions or rigidity, asphyxia, cyanosis or markedly increased blood pressure, under which he may deliberately work with comfort.

The enthusiasts of a few years ago who so strongly advocated operating under nitrous oxide while the patient was in the first stage of anesthesia the analgesic stage, have dropped their extravagant claims to its universal applicability and now use it in its proper place, as an adjunct to suggestive therapy or hypnosis, in favorable subjects. Thus, the practitioner of today finds himself confronted with an array of pain relieving methods and a positive demand that some of them be employed in daily practice. Here the personal equation enters into the consideration and the same care and skill in anesthetics is required as that required in performing any other dental service. To become expert in gold foil manipulation one must insert gold foil. In order to become proficient in anesthesia one must give anesthetics.

If nitrous oxide be administered by

one skilled in its symptomatology excluding all air for the first twelve to fifteen inhalations, then adding three to four per cent oxygen for a few inhalations gradually increasing the oxygen percentage to keep the dusky color from the patient's face until the mixture is approximately ninety two per cent nitrous oxide and eight pre cent oxygen, there will develop a tranquil anesthesia that is absolute; that does not depend upon hypnosis or suggestion for its certainty, that may be maintained for five, ten or fifteen minutes if necessary without serious danger to the patient. The blood pressure is not raised more than twenty to thirty millimeters of mercury and the patient is not likely to suffer from nausea or to recollect anything that has transpired. Such an anesthesia is ideal for the extraction of teeth for children, for uncomplicated extractions in adults, for opening pulp chambers in abscessed teeth, for surgical procedures of short duration such as lancing abscesses, boils, felons, maxillary sinus operations, etc.

Continuous anesthesia for oral operations is somewhat difficult with nitrous oxide because the patient will, sooner or later, begin to take in air thru the mouth. This is most likely to occur in patients having nasal obstruction.

The following may be considered as difficult nitrous oxide patients,—those suffering from goitre, asthma, nasal obstruction, alcoholics, drug addicts and the obese. It is considered inadvisable to administer it to the aged or others carrying a high blood pressure unless urgent indications for general anesthesia are present.

Local anesthesia like general has had its developmental difficulties. The ice pack, later the ether or ethyl chloride spray, produced surface refrigeration; but if carried to the point of anesthesia from freezing produced a marked lowering of the vitality of tissues and in some instances actually resulted in slough. At any rate the most that can be expected of refrigeration is an incomplete surface anesthesia. Used in sensitive cavities refrigeration is extremely painful in its application and while it will produce a rather satisfactory anesthesia for excavating sensitive dentin it occasionally will cause the death of a pulp so treated.

From the local anesthetic standpoint, cocain has always performed the function of completely obtunding sensibility whenever it is placed in proximity to sensory nerves or their end organs, but because of its marked toxicity and the unexpected idiosyncrasies of patients toward it, its employment has been a source of apprehension to the operator. For this reason many substitutes have been offered, and while they in most instances are found to be less toxic in equal percentages of solutions their anesthetic potency is never so great as cocain. Therefore, they must be used in higher percentage solutions in order to obtain equal anesthetic value. Novocain most nearly approximates the ideals sought for today, after fourteen years of extensive use. It is non-toxic in the required dosage, non-irritating to living tissue, stable enough to withstand sterlization by boiling and is capable of uniting temporarily with nervous tissue in a manner to produce an anesthesia that is satisfactory to both patient and operator. The difficulties encountered in its application are not to be traced to the novocain but to the means of its application. If we could dispose of the hypodermic syringe in its use—novocain's adoption would be universal since most of the soreness, sloughing of tissues, after pain, infections, broken needles lost in tissues, painful injections etc., result directly from the use or rather the misuse of the hypodermic syringe and to the employment of unsatisfactory solutions.

In overcoming some of the disagreeable sequella that have too often followed the administration of local anesthetics in the past, we found it necessary to make certain modifications; first in the solu-

tion, second in the manner of carrying the solution into the tissues.

The fact that novocain and body fluids are both miscible with water makes it logical to employ that universal solvent as the vehicle for carrying the anesthetic agent to the tissue that we wish to influence. Sterile distilled water presents no properties capable of producing injury beyond that of disturbing the osmotic balance between tissue cells and their surrounding fluids; a feature that may readily be overcome. In order to obtain uniform results the use of freshly distilled water is demanded for the reason that deterioration takes place in distilled water upon aging. This is evidenced by the collection of sediment in the bottom of the container after a time, in the form of a flocculent precipitate. Decomposition may be augmented by the action of light, bacterial organisms, or by chemical compounds in the composition of the glass or other container. That anesthetic solutions compounded with distilled water that has become stale are more irritating than those prepared from freshly distilled water has been observed by many operators. Therefore, let us start right in the preparation of our solutions by procuring freshly distilled water; this can be quickly prepared in some one of the small inexpensive stills obtainable from any dental or surgical supply house, distilling the amount required from day to day as it is needed.

Physiologists long ago observed that the bathing of tissues in unmodified distilled water caused a swelling of the individual cells. This is brought about by a disturbed osmotic balance; the tissues containing normally a definite percentage of crystalloid material in the form of salts; principally the chlorides of sodium, potassium and calcium, the aggregate amounting to approximately six tenths of one per cent. The presence of these salts cause the hypotonic distilled water to be imbibed by the tissue cells resulting in swelling and mechanical injury to the delicate stroma and cytoplasm and may even cause the rupture of the cell wall.

This disturbance within the cells of any tissue injected with a hypotonic anesthetic solution is in itself sufficient to account for much of the smarting, pain, swelling and after soreness so frequently observed following the administration of some widely advertised proprietary preparations. These disagreeable symptoms may be avoided by the addition of the proper amount of salts to the water, rendering the osmotic balance equal to that of the human tissues. The so-called Ringer's solution fills this need satisfactorily, having a formula of

Sodium chloride.....0.6 per cent
Calcium chloride....0.04 per cent
Potassium chloride...0.02 per cent

For convenience in compounding the ingredients in their respective proportions have been incorporated in tablet form by various pharmaceutical houses rendering the making of the Ringer's solution a very simple matter. All that is necessary is to add a tablet to a measured quantity of freshly distilled water. This solution may be injected hypodermatically without irritation save that resulting from the introduction of the needle, because it does not disturb the osmotic balance of the cells with which it comes in contact and is non-irritating when freshly prepared and sterilized. If soreness should occur after the injection of such a solution it is usually traceable to excessive force used in expelling the contents of the syringe.

Novocain, a white crystalline powder synthetically prepared, is freely soluble in water in all proportions up to equal parts. It is non-irritating, even when the pure crystals are dusted upon abraded surfaces; it is vaso-dilator to a very slight degree, and it is non habit forming—being exempt from the Harrison Narcotic Law requirements. Novocain possesses the property of combining tem-

porarily with nervous tissue in a manner to bring about a suspension of its power of receiving or of transmitting impulses during that period of combination, and of leaving no perceptible tissue change after its effect has been dissipated. It is rated as being seven times less toxic than cocain while idiosyncrasies are extremely rare. Amounts of three to six ounces of a 1% solution and from one half to one ounce of a 2% solution have often been employed in extensive operations in general surgery, without untoward effects, placing the comparatively small amounts required for dental uses entirely within the limits of absolute safety; no other cocain substitute is so nontoxic.

A 1% solution of novocain for infiltrative anesthesia in minor surgery such as simple extractions, pulp extirpations etc., and for conductive anesthesia in the upper jaw where the nerve trunks are of small diameter leaves nothing to be desired; but for conductive anesthesia of the heavier mandibular nerve a 2% solution should be used in order that the drug will reach the central fibres of the trunk in sufficient amount and concentration to give a complete anesthesia of the deeper structures including the pulps of the teeth. If a 1% solution be used here an anesthesia of the lip and soft tissues supplied by the outer fibres would ensue but the central fibers being unaffected by the weak solution would retain their function and the result would be a failure to anesthetize the dental pulps.

Following the isolation of the blood pressure raising principle of the suprarenal gland with a study of its physiologic action and the ischemia produced by its topical application due to its vasoconstrictor properties, it was suggested that the combination of adrenal solutions with local anesthetic agents would tend to localize and thus intensify and prolong their effect by preventing their rapid dissipation and absorption into the systemic circulation. Clinical evidence has conclusively proven this to be true, while it also, for the same reason, was found to possess the additional advantage of preventing toxic symptoms. Thus it has been demonstrated that cocain may be employed in one-half of one per cent solution when combined with adrenalin with results equal to a two per cent solution without it, in so far as the anesthesia is concerned without so great a danger of toxic symptoms.

The organic product obtained from suprarenal glands of animals offers a rather unstable preparation; but in recent years a synthetic preparation of identical formula has been marketed that has better keeping qualities than the organic product and being obtainable in tablet form is convenient for use.

Suprarenin when introduced into the circulation causes an increase in the force and frequency of the hearts action accompanied by a marked rise in blood pressure due to its direct action upon the musculature rather than to stimulation of the central nervous system. Locally it constricts the smaller blood vessels by direct stimulation of the circular muscle fibres in their walls. Upon injection hypodermically, this vaso-constrictor action is evidenced by an ischemic area surrounding the site of injection for a distance of one to two centimeters within five or ten seconds and lasts from thirty to sixty minutes. After a time the effect wears away and a condition of vasodilatation ensues, lasting for several hours; probably due to exhaustion of the muscular tunics from over stimulation.

Suprarenin, if administered in an overdosage produces the quite characteristic and distressing signs and symptoms of precordial pain, air hunger, dizziness, a very full and often intermittent pulse, headache, etc. The symptoms come on suddenly, but are very transient lasting only from three to ten minutes and while they are those of an over-stimulation, they are not followed by the long period of depression that is observed in cocain

toxemias. In the few cases that I have had, no medicinal treatment was given, the symptoms very quickly subsiding without assistance and the operations performed withour further difficulty. These symptoms may often be averted by following the slow injection method. Just as the point of the needle enters, the tissues expel two or three drops of solution and then wait a few seconds to allow the vaso-constrictor action to take place before continuing. The barrier formed by the ischemic ring resulting from the primary injection walls off and prevents systemic intoxication, and incidentally increases the profundity of the anesthesia by retaining the solution in the injected area. The needle may then be advanced and the solution be very slowly expelled that it may be imbided, not forced, into the tissues.

One other requisite of local anesthetic solutions is that they be rendered sterile. We need not discuss the dangers of tetanus or septic infections resulting from unclean needles or infected solutions. Many antiseptics have been employed, the majority of them being used with the idea of their acting as preservatives for stock solutions. Unfortunately the ideal anesthetic solution cannot be really preserved successfully for more than a few days, and all of the preservative agents employed are open to criticism inasmuch as the anesthetic solutions are less irritating if they are omitted.

A freshly prepared solution may be boiled for a short time thus rendering it sterile without impairing its action in the least and is to be recommended over the chemical preservatives that have been suggested from time to time. The practice of adding cardiac, cerebral or respiratory stimulants followed for so many years is looked upon today as unwarranted and unnecessary and their addition should be discouraged.

To review briefly, our anesthetic solution is now composed as follows: Freshly distilled water as a vehicle, one to two per cent novocain as the anesthetic agent, sufficient chlorides of sodium, calcium and potassium in the form of a Ringer's tablet to render the solution isotonic with the body fluids, sufficient suprarenin to localize and retain the anesthetic mixture in the locality in which the injection is made, and the solution thus compounded sterilized by boiling.

For simplicity, all of the ingredients have experimentally been included in one tablet but these show indisputable evidence of deterioration after being kept for a few weeks so they are not to be depended upon. However, time has shown that novocain and synthetic suprarenin may be included in the same tablet without deterioration, and Ringer's solution tablets may likewise be kept indefinitely. By the use of these two tablets and freshly distilled water we are enabled to prepare a fresh solution in a few minutes that will cut short the patient's discomfort many hours when compared to the stock solutions too often employed, and the absence of after soreness and pain fully compensate for the extra effort expended.

Body cells in the deep tissues are just as much, if not more subject to catching cold or of having their resistance lowered by cold as our respiratory mucosa, and the chilling of the site of injection by carrying a cold solution into the tissues unaccustomed to temperature changes is undoubtedly productive of damage. This consequent lowering of resistance and retarding of tissue repair may be avoided by the injection of warm solutions. If the anesthetic solution be drawn into the hypodermic syringe soon after boiling and the slow injection proceeded with, it will be found to be just about the body temperature by the time it reaches its destination. This important item has been too often thoughtlessly disregarded in local anesthetic operations.

Then too, we must consider the amount of force needed for injection ever bearing

in mind the small amount of pressure actually required to traumatize and injure living tissue when hydraulicly applied. We have all seen instances in which areas of necrosis one centimeter or larger in diameter have occurred. These are seen most frequently in the upper and lower first molar regions and are often traceable directly to hydraulic pressure exerted by the forcing of an anesthetic solution therein with a heavy syringe. We must ever bear in mind that fixed cells unaccustomed to trauma are bathed in lymph, and that serious damage is sure to result unless time be allowed during the injection for the lymph to escape ahead of the anesthetic solution as the latter is forced in to replace it, and in order to avoid mechanical injury only a very light pressure upon the piston is permissible during the injection. If forty to sixty seconds are consumed in emptying the syringe in loose cells and two to three minutes in firm gum tissue those minutes are well spent and are far from being time lost.

Oral mucosa like the skin, constantly harbors infectious bacterial organisms in its superficial layers. These are held in abeyance under normal conditions by the phagocytic properties of the leucocytes, but if they be carried mechanically into the deeper structures inflammatory processes would likely ensue. This carrying of infectious material along the course of the needle has undoubtedly been the cause of considerable after soreness, pain and delayed healing following the administration of local anesthetics and should be considered as one of the avoidable accidents.

Tincture of Iodin U. S. P. 7% applied by means of a tightly rolled pellet of cotton and massaged well into the mucosa at the point selected for the insertion of the needle will not only fix the bacteria in the tissues and disinfect the site, but will render the pain of the initial puncture with the needle almost imperceptible.

With a little practice any operator may so train himself to manipulate the hypodermic syringe that the pain of the insertion may be still further minimized by holding the syringe during its insertion in such a manner that no change in the grasp need be made after the needle is inserted in order to expel its contents. The best method will be found to be the balancing of the syringe with the barrel resting between the second and third fingers of the right hand, placing the first and fourth fingers above the second and third respectively, with the cross bars resting between and the thumb on the piston. Holding the syringe in this manner permits the injection of two or three drops of anesthetic solution just as the needle enters the mucous membrane and allows the injection to proceed while it is advanced thru the tissues thus anesthetizing ahead of the needle as it is carried in.

The site selected for the primary insertion of the needle should when conditions permit, be at the point of reflection of the buccal or labial mucosa from the alveolar process. Mucous membrane at this point because of its protection from irritation, has a much poorer sensory nerve supply than the mucous membrane of the gingiva and by taking advantage of this we may make the needle insertion at that point with a minimum amount of pain. The submucosa here is loosely constructed, with large intercellular lymph spaces, allowing the injection of anesthetic solutions with very little pressure, there being an easy interchange of anesthetic for the lymph surrounding the fixed tissue cells giving true anesthesia without such disastrous complications as tearing or traumatizing of tissue from the exhibition of excessive force because the operator happens to be in a hurry.

One of the most frequent causes of imperfect anesthesia, that is met with today is that the operator after making a satisfactory injection will proceed with

the operation immediately without waiting for the anesthetic agent to act upon the nerve fibres. All of the local anesthetic agents in common use require from five to eight minutes contact with nerve endings or nerve fibres in order to be absorbed and to reach the maximum anesthesia. Therefore, when we allow for diffusion thruout the injection area and sufficient time for the drug to be absorbed and reach the maximum anesthesia possible, ten minutes from the time the injection is started is not too long to wait for a true anesthesia of any of the smaller nerve fibres, and from fifteen to twenty minutes are needed for larger trunks such as the mandibular and possibly the posterior dental and infraorbital nerves.

If anesthesia be obtained immediately following either infiltrative or conductive injections it may safely be assumed that it is a pressure anesthesia from tissue injury produced by using too much force during the injection rather than from any action of the anesthetic agent employed, and would be obtained just as certainly if water had been used instead. This is to be avoided because a condition of lowered resistance is produced from the injury, accompanied by after soreness and edema and is often marked by delayed healing.

Local anesthesia is classified under two distinct divisions, viz. Infiltrative; —the application of a local anesthetic agent to the distribution of sensory nerves thus paralyzing their endings and their power of receiving impressions, while conductive or block anesthesia consists of the injection of a local anesthetic solution into the region surrounding a sensory nerve trunk thus paralyzing its power or transmitting afferent impulses sent up from its area of distribution.

For many procedures the infiltrative type of anesthesia is perfectly satisfactory, for example, the removal or normal or hypertrophied gum from over erupting teeth or from proximal cavities that it has filled in, or of hypertrophied pulps the injection may be made directly into the tissue to be excised so that the point where the puncture is made is excised with the tissue thereby avoiding after soreness from that cause as would probably occur to a slight degree if the puncture and injection be made around the area. For the removal of superficially seated roots that have little bony process supporting them, the infiltration may be made by injecting to the buccal and lingual surfaces allowing sufficient time for the maximum anesthesia to ensue. For cavity preparation in the lower incisors or the ten upper anterior teeth the infiltration of 1 c.c. of solution over the apices of the roots will usually obtund sensation. For the extraction of lower incisor teeth infiltrative anesthesia suffices and is preferable to conductive since the latter affects the entire side of the face producing the characteristic paresthesias for two or three hours which is somewhat annoying to the patient while recovery is taking place. The maximum anesthesia in the infiltration of superficial areas requires waiting for five to ten minutes after injecting. For extraction of deciduous teeth, the roots superficially seated in controllable children, a small amount of novocain solution infiltrated about the teeth will give perfect anesthesia,—the principal difficulty being to make the needle prick as nearly painless as possible. If abscess conditions exist about deciduous teeth gas oxygen anesthesia should be employed.

Almost everyone who has seriously entered the practice of conduction anesthesia has found that with increasing experience in its use he employs it more and more to the exclusion of the formerly more commonly practiced infiltration. This is accounted for in the comparative painlessness of the needle insertion and the injection, the small amount of solution required for blocking large areas, the absence of after pain or soreness, and the absolute anesthesia obtained.

Patients upon whom it has been used for cavity preparation or surgical precedures are pleased with the results and request its use on subsequent occasions and that encourages one to use it with increasing frequency as time goes on. It is not recommended over, nor will it ever supplant nitrous oxide for the highly nervous, the uncontrollable neurasthenic who dreads the sight of instruments; for the physically exhausted individual who has been in pain for a number of days; for the child with whom it is difficult to reason, nor for extractions in acute abscess conditions. But for the preparation of the sensitive cavity that does not respond favorably to the usual methods of desensitization such as compressed air, dehydration, volitalization of phenol and essential oils, sharp burs and delicate manipulation, for the removal of vital pulps with the possible exception of the lower molars, for root amputations; for extractions; for prolonged and complicated operations such as the removal of unerupted and impacted teeth; for maxillary sinus operations; for the reduction of fractures of the mandible and for the removal of tumors and cysts about the jaws it gives complete anesthesia. The patient can be placed in any position in the dental chair that is most convenient to the operator, there is no aspiration or swallowing of blood or mucus and no nausea, vomiting or prostration after the operation is over. In fact the anesthesia will usually last until the patient reaches home which in itself is highly desirable.

The use of the high pressure syringe for the purpose of pulp removal or excavation of sensitive dentin has been almost wholly discarded since its use often necessitated the drilling of a separate cavity or pit for the purpose of confining the solution. Then the occasional reports of death of the pulp subsequent to its use discouraged most of its strongest advocates.

So we find ourselves today face to face, not with a theory but with proven facts. First: Anesthesia for dental operations is essentially necessary from the humanitarian standpoint alone. Second: Patients suffer degenerative changes in vital structures when painful operations are performed without anesthesia. Third: Many prospective patients are barred from much needed dental service by fear, because dentistry in the past has been too prone to ignore the pain inflicted upon patients. Fourth: If more painless methods are adopted, patients will be seen more often with the result that the vitality of pulps will be better conserved. Fifth: No dentist can do as thoro and lasting operations upon teeth or their supporting tissues if the patient is suffering pain as he would do if anesthesia were present.

In my opinion conductive anesthesia has many advantages over infiltration in that it affects deeper tissues giving total anesthesia to an entire area while infiltration is a surface affair. The needle insertion is almost painless and the tissue disturbance at the site of injection is practically nil.

I believe that the removal of vital pulps under anesthesia is to be preferred to arsenical pastes in most instances both from the point of minimizing pain and because tissue destruction is then mechanical and is under the control of the operator.

In the employment of any method the success or failure often rests not upon the anesthetist but with the patient. There are patients who come to an office expecting local anesthesia, who will fight attempts toward the induction of a general anesthesia and if enough time and patience are consumed to coerce them into taking a general anesthetic will develop all possible unpleasant complications and go home with a feeling of resentment toward both the anesthetic and anesthetist. That patient should have had local anesthesia.

On the other hand I have seen patients who desired general anesthesia in

conditions where in my opinion conductive would better serve the purpose,—would secure perfect local anesthesia, but patient apparently suffer so marked mental distress that I would finish with general anesthesia. Therefore, it should be borne in mind that the attitude of the patient is worthy of serious consideration in the selection of an anesthetic. Remember that a patient is sometimes a patient not always a "case."

In conclusion your essayist is of the opinion that there is a place in every practice for the gas machine, compressed air, infiltration, conduction and possibly intra-osseous anesthesia, and above all, the operator who knows kindness, firmness of conviction, sympathy and human understanding—who will select anesthetics with care to fit his patient as well as the operation.

Discussion.

Louis Schultz, Chicago.

In reviewing the essayist's paper seriatim for the purpose of discussion, I find myself at variance with him when he says that those who were enthusiastic a few years ago about nitrous oxid analgesia have relegated it to the past and are using local anesthesia instead. If that is the rule, I am one of the exceptions, as I still use nitrous oxid analgesia in certain cases and with a great deal of satisfaction to both my patients and myself. I do not use it as freely as I did before conductive anesthesia became popular and I appreciate the value of the latter method to a degree which in the average case makes it my method of choice. However there are cases for whom nitrous oxid analgesia amounts to almost the sine qua non and in such cases I use it unhesitatingly. Hence I would say that in properly selected cases nitrous oxid analgesia must even now be regarded as the method of choice.

I have experienced no difficulty with nitrous oxid in goiter cases except perhaps that type of goitre causing a dyspnoea hence I believe that barring that type, goitre per se does not offer a particular objection to the exhibition of nitrous oxid. I would, however, add a group of cases to those enumerated by the essayist as difficult in the administration of nitrous oxid, namely children. And I believe a good rule to accept is that in inverse proportion as a child is younger than ten years of age does nitrous oxid become more dangerous as you give it for general anesthesia. In the hands of a skilled operator, appreciating the danger and if limited to short anesthesias no serious results need be feared, but these cases should be given even greater care than those of the average adult.

As to local anesthesia I will confine my remarks to the conductive method since that is for we as dentists the most important and most satisfactory type of local anesthesia known.

Let me preface those remarks however with a general statement and I want to make this statement with all the emphasis at my command and that is that the operator who wishes to practice local anesthesia must know and must observe and practice asepsis. The man who does not have the sense of asepsis, who cannot develop it, who is not willing to insure surgical cleanliness in the performance of this work had better leave local anesthesia alone. He is going to have trouble if he attempts to practice this art and he is likely to decry the method and say it is no good.

Lack of asepsis if often responsible for soreness, sloughing of tissues, after-pain and suppuration. A stale solution may also produce the manifestations of infection just enumerated. The cause of these symptoms lies with the operator not with the method. Lack of care, lack of asepsis, traumatic injuries due to dull needles, stripping up of periosteum, too swift an injection of the agent, lack of isotonia, too great a variation of tempera-

ture, solution made of partially deteriorated substances, stale solutions and those containing antiseptics furnish some of the causes of untoward after effects in the practice of local anesthesia.

The essayist refers in his paper to broken needles. Now, needles are broken because the patient suddenly twitches his head to one side when the needle is in the tissues, but they are also broken because they are too old (rusty) too dull, too thin, too short or because of improper technic as, for instance, trying to go around a corner with a steel needle which is imbedded in the tissues.

The essayist makes the statement that no other cocain substitute is so nontoxic as novocain. I cannot agree with him. We have another drug no more toxic than novocain, synthetically prepared like novocain, yet absolutely different in its construction and that drug is apothesine. It is just as quick in action and quite as potent as novocain. Personally I would just as soon use Apothesine as I would novocain or procain.

As to the strength of solution employed the essayist says that one cannot get anesthesia of the larger nerve trunks by using a solution containing less than two per cent of the anesthetic agent. Personally I have come to use a one per cent solution of either novocain or apothesine for all my work. I do not find the stronger solution necessary. And I use a freshly prepared normal salt solution as a vehicle. Ringer's solution for this purpose is just as good, no better. Both solutions are non irritating to the tissue cells and all we need is a solution of about the same osmotic tension as that of the tissue fluids of the body.

A word with reference to the use of suprarenin or adrenalin in the solution. The essayist prefers suprarenin because he says it is more stable and that adrenalin is not of uniform or standard strength. The statement is frequently made that adrenalin is not of uniform strength while suprarenin is. That is what is claimed for suprarenin by its manufacturers. As a matter of fact adrenalin is standardized, is of uniform strength and can be absolutely depended upon. The same is true of the solution which is freely used all over this continent by both the medical and dental professions. As to the stability of the two agents, I believe that they are about evenly matched, at least they are alike so far as practical purposes go. For instance adrenalin may be boiled three different times over an open flame for fifteen minutes without loss of activity after the second boiling and but slight loss after the third, while suprarenin shows a slight loss after the second boiling and more after the third. So I think that this preference of suprarenin is another piece of German propaganda. There is, however, this difference, a solution containing suprarenin which becomes pink on boiling should be discarded because of the great toxicity of the partially oxidized suprarenin, while a solution containing adrenalin of similar color may be used with just as much safety as a perfectly clear solution, the only change in this solution being a slight loss of activity of the adrenalin due to such deterioration, but no increase in toxicity.

This brings to mind the question of relative toxicity of the anesthetic agent and the suprarenin or adrenalin. One is apt to think of novocain or apothesine in cases of poisoning and forget all about the real offender. As a matter of fact if toxic symptoms develop they are usually due to the suprarenin or adrenalin and not to the anesthetic at all. To impress on one's mind the toxicity of these latter drugs a comparison of their dose with that of novocain or apothesine is in order. The dose of adrenalin or suprarenin is five tenths of a milligram (0.0005) while the dose of novocain or apothesine varies between three tenths of a gram and eight tenths of a gram (0.3-0.8) or an average of five tenths of a

gram (0.5.) We see at once that the dose of adrenalin or suprarenin is one thousand times less than that of novocain or apothesine. Hence great care is necessary in the use of the former agents. If the solution we use contains adrenalin or suprarenin in a proportion varying from 1:50.000 to 1:100.000 we need not fear trouble from its use.

The most potent solution results when we compound it at the time we wish to use it, taking a sufficient amount of a freshly prepared normal salt or Ringer solution as a vehicle, adding to that the required quantity of novocain or apothesine then adding a sufficient amount of suprarenin or adrenalin to meet the requirements of the case in hand. Boil and inject at body temperature. Here too, I differ with the essayist when he says that the ideal solution is one that can be kept for a few days and can be used after a few days. I do not believe in using stale solutions, I want a fresh solution.

As to the management of the highly nervous and neurasthenics who come for operation which demands a local rather than a general anesthetic, I usually administer a sedative one-half hour before the operation and thus avoid trouble. For this purpose bromural six-tenths of a gram for an adult may be used or validol seven drops in a little water may be employed and the patient becomes composed and calm to a degree which permits the work to proceed in a satisfactory manner.

The essayist gives acute abscess as a contraindication to the use of a local anesthetic and where such an abscess lies in the path of the needle or at the site of injection for conductive anesthesia, I agree with him and use nitrous oxid. In all other cases we have the choice of both methods, which ever appeals to us to be the more expedient.

I would like to have the essayist explain in closing the discussion how he expects that ischemic ring produced at the point of entrance of the needle to influence the solution which he injects for nerve blocking. The ring produced is very small and located from two to three centimeters away from the point at which the principal injection is made, hence cannot possibly influence the tissues at the latter point.

The author has dealt with the subject of anesthesia more from a general than from a detailed or specific standpoint. There are some points I wish to mention at this time which seem to be of great importance to the beginner and which when observed insure success for all practitioners in the greatest number of cases. They are points which I have evolved in my experience in conductive anesthesia, which are not found in textbooks.

First: Technic of mandibular injection. Needle is inserted according to method advocated by Fischer, which means that when in the mandibular fossa it has entered the soft tissues to a depth of about three quarters of an inch. If at that depth the point of the needle strikes the bone, so that it can be advanced no further in the same direction the injection made at that point will be successful every time. If you do not strike bone (the posterior lip of the mandibular sulcus) inject a few drops and repeat technic of inserting needle. Point of entrance may be too low, direction of needle may be wrong.

In this connection I wish to mention a statement we find in most textbooks which is wrong, namely, that in most cases when you make this injection you will also block the buccinator or buccal nerve. That in some cases you do not get it. In these cases you find sensation in the gums on the buccal aspect of the molars which calls for an additional injection to control that nerve. That is all wrong.

The course of the buccal nerve lies entirely out of reach of the injection under discussion. It is given off from

the anterior division coming from the common trunk of the third division of the fifth nerve and is described as passing obliquely forward between the two heads of the external pterygoid to reach the buccinator muscle. The superior head of the external pterygoid arises from the infratemporal surface of the great wing of the sphenoid, the inferior head from the lingual surface of the lateral pterygoid lamina of the pterygoid process of the sphenoid bone. So as a matter of fact we never reach this nerve when we make our injection and the anatomic facts are that this nerve supplies those gums in only fifteen or twenty per cent of cases and in all those we must inject to block the branches in the cheek.

The blocking of the posterior superior alveolar branches seems another difficult route for the beginner. Here too follow Fischer's directions but when needle is about one centimeter in the tissues, make sure that you are near the posterior surface of the maxilla by making a little pressure forward on the syringe so that you may feel if the point of the needle is near bone, if it is, advance it in the same direction to full depth, if not, inject a few drops and change direction of needle until you feel the bone. Needless to say that for this you need a steel needle 24 gauge and that is the only kind I use anyway. By following the above directions you will have uniform success with this injection.

As to infraorbital injections, I would like to suggest caution in following any definite set of landmarks because they do not hold true. You cannot go in a certain direction from the cuspid tooth because the foramen will not lie in that direction all the time, nor can you find it by using the bicuspid as a guide even when there is a full complement of teeth with perfect alignment because there is such a wide difference in different heads that one cannot rely very much on any definite set of landmarks for this injection. There is one method however which does spell success and that is the actual locating of the foramen by palpation with the index finger and the guiding of the needle to place by means of that finger. When in situ with the opening of the needle looking backward into the canal, make firm pressure with the finger over foramen while injecting and no massage will be necessary after the injection nor will there be any swelling on the face.

If these remarks will prove of help to any beginner or practitioner I will feel that I have not taken up the time of this society in vain.

Henry L. Whipple, Quincy, Ill.

The essayist has given you a most excellent paper and I wish, first, to congratulate him most sincerely. He has handled the subject with rare judgement and has given us excellent data.

When you trace the trend of thought and, following the essayist "from the time of the barber and the blacksmith, who extracted teeth as a side line" one can hardly refrain from expressing himself in these words: "How long, oh Lord" will we be jumping from this idea to that one, fathered by the radical investigator and the dreamer.

Let us refer to the essayists statement relative to pulp conservation: You may look back to the time when the dental practitioner deemed wisely that a tooth with an exposed pulp should by all means be extracted, and if you please, follow up in your mind the methods of treatment of such cases, to the present time. If you happen to be interested in the investigation of the etiology of systemic ailments, directly traceable to the foci of infection in the oral cavity, will we not debate in our own minds if it isn't possible that in the near future we may come back to the idea once again, that in such cases, immediate extraction, which will not necessitate the curettement of the process, is the wiser, as an ounce of prevention vs. a pound of cure?

You must not get the idea that in this discussion I am digressing, for you will see that it must lead to the proper or indicated method of anesthesia for these cases and I most heartily agree with the essayist, that anesthesia is an absolute essential to the health of the individual who is placed in our care. Whether the patient is to be anesthetized generally or conductively or locally, we must be thoroly aware that there is a certain shock to the nervous system suffered by him which can not be obviated no matter how surely he may KNOW he is not to be hurt, you may therefore well imagine the extent of ADDITIONAL shock to the nervous system when the patient is aware that the operation is to be performed without anesthesia, no matter how stoical he may be.

The essayist does not take you any farther back in the use of nitrous oxide than the time of Wells, in the 1840's, and it may be interesting to know that nitrous oxide was discovered by Priestly in 1772 and the principle use made of it at that time was as a means of entertainment, as are our hypnotic entertainments in the present day. It was known to produce peculiar sensations and mental effects when used or inhaled in the pure state and the enjoyment of the audience in the anties of the subjects made a rare evenings entertainment.

Its use in surgery, was first suggested in 1800 by Sir Humphrey Davy, and Wells in 1840 began its use in his practice and even went so far as to administer it in cases of amputation etc. It was carried on by Morton and Colton and Long and it was during a period of serious controversy between himself and Morton, who had been a student under him, that he died by his own hand in the year 1848.

If the technic given by the essayist is carried out perfectly, I can not see any reason why the patient could not be held in a stage of deep anesthesia, safely, for hours and in fact I have seen very serious abnominal operations performed in the deep stage of nitrous oxide anesthesia, maintained for a period of three hours and the blood pressure remaining relatively normal and the color remaining a perfect pink.

As the patient progresses from the conscious into the unconscious state, the following changes, which will serve as landmarks to the anesthetist—. The respiration may voluntarily be of any type until consciousness is lost, it then settles down to a rythm in anesthesia, with inspiratory and respiratory phases nearly equal, but slightly faster than normal and uninfluenced by the surgical procedure. Should the respiration become irregular or spasmodic, the stage of anesthesia is too deep and is threatening.

The blood pressure in the early stages, before consciousness is lost and tranquility secured, would be higher as a result of rapid heart action, fear etc, but within a few minutes, however, the pressure returns to normal or lower and is modified thereafter by conditions of the operation.

The essayist touches upon the developmental difficulties undergone in the past with reference to local as well as general anesthesia and speaking particularly of cocaine as an anesthetic, I would say with great earnestness, that he is correct in asserting that "its employment has been a cause of appreciation to the operator."

Personally, I have been very much afraid of the results of the use of cocaine and have not used it for many years, and I can assure you that when you are confronted with unexpected idiosyncracies of your patient towards the toxic effect of this drug, you will need to be well trained in the proper and effective treatment antagonistic to its effect. It might be added, that your own blood pressure at such a time will be very much above normal.

With regard to novocain, I heartily

agree with the essayist in the statement that it is the most nearly approximating the ideal sought today. Its non-toxic, non-irritating properties in proper dosage makes it most acceptable as a medium of anesthesia.

The technic given by the essayist is ideal and it is most necessary that operations be carried on in an aseptic manner and the field must necessarily be in a perfectly aseptic condition. I would therefore emphasize his thought and dwell not only upon the essential aseptic solution and needles but would reiterate his caution, that drying and sterilizing the mucosa with iodin prior to the injection, will not only kill the bacteria but will render the pain of the initial puncture almost nil.

I wish to again thank the essayist for his most profitable paper and I desire to congratulate this society in being its recipient.

Arthur E. Smith, Chicago.

Mr. President and Members of the Society: I wish to congratulate the Chairman of the Program Committee on securing Dr. Puterbaugh to present this interesting subject to us this afternoon. It is exceedingly difficult to discuss Dr. Puterbaugh's paper inasmuch as the points he has covered are concrete. I agree with him in all that he has said with the exception of a few minor points. I do not know of any paper to which I have listened and have been invited to discuss that has interested me so much as the paper Dr. Puterbaugh has presented. He has given us not only concrete facts but a comprehensive view of the whole subject.

The modern trend of the dental profession today is the elimination of pain, and I think those dentists who do not take advantage of the various methods which have been discussed are turning their patients away from the comforts which they should enjoy from anesthesia, local or general, whenever used. I think a large percentage of the laity realize that it is possible today to perform the most painful dental operations without pain, and that this subject of the elimination of pain in the practice of dentistry is a very peculiar one; it is something that demands a great deal of consideration and study, and one that in the past has been passed by as a side-line more or less, and I think many practitioners have looked upon it as a mere specialty or as an excuse for using a slipshod method. I think the time is coming—in fact, it is here now—when most of us realize that the elimination of pain in the practice of dentistry is a reality. It is not as practiced by the quack in years gone by. We have methods at our disposal today which, if mastered, will give patients the benefit of the relief of pain, and in so doing we certainly can perform better and higher class operations. The dental profession should feel proud of the fact that it has in a great measure been responsible for the advancement which has taken place since the year 1844, when Wells made known to the world surgical anesthesia produced thru the medium of nitrous oxid-oxygen.

To illustrate what Dr. Puterbaugh has said, I will say that in the year 1885 or 1887, anesthesia was produced by injecting a solution in the region of the mandibular fossa, thus producing anesthesia of the inferior dental nerve. I spent a great deal of time in the library recently looking up the history of local anesthesia, and to the best of my knowledge I have found that the first nerve blocking injection is due to Professor Matas of New Orleans. He injected alcohol in the region of the second division of the fifth nerve which crosses the

spheno-maxillary fossa in a woman for tic douloureux in the year 1884. Dr. George W. Crile, of Cleveland, Ohio, injected a weak solution of cocain into the region of the brachial plexus in 1887 before the Ohio State Medical Association. This nerve blocking injection was for the amputation of an arm. So after all, according to the literature and in going thru the records, I have found that Professor Matas, of New Orleans, deserves the credit for making the first nerve blocking injection. When we couple that with the discovery of chloroform, ether and nitrous oxid anesthesia by Americans, it certainly should make us feel very proud of that fact.

Do not use anesthetics in your practice merely as a convenience. It is a great convenience, in that it places the patient and you in a position whereby you can operate much faster, whereby you can render a greater service than if you were inflicting pain upon many patients on whom it is not possible to operate without inflicting pain.

The essayist spoke of the failures which were encountered by Dr. Wells in the administration of gas-oxygen. It is not to be wondered that Dr. Wells failed in his demonstration which he gave in the Massachusetts General Hospital in Boston. The apparatus he used was very crude, it consisting of a large bag to which was connected a large rubber tube generating the gas, with a place being provided for squeezing out the gas. It is no wonder Dr. Wells failed. Today we have a number of American nitrous oxid appliances, and those modern machines cannot be compared with the very crude apparatus that Dr. Wells used.

The fundamental basis of general anesthesia first of all, is the symptomatology as Dr. Puterbaugh brought out. The anesthetist by all means should be able to detect the pathological heart. He should be able to tell when danger is approaching. He should be able by all means to know the pharmacological action of his gas and oxygen, ether and chloroform, or whatever he may be using, so that the fundamental basis of general anesthesia, you may say, is physical diagnosis and of being thoroly familiar with the drug which you are administering.

I might also bring out the point that in many cases, instead of producing anesthesia, asphyxia is produced, and in this respect I have reference to gas-oxygen. Many of you gentlemen have noticed after the administration of gas-oxygen, the patients have become black in the face. That is not anesthesia by any means. It is asphyxia, and many of the patients whom you hear occasionally of dying in the dental chair, if the truth was known, were subjected to extreme cyanosis. General anesthesia is contraindicated in cases of increased blood pressure changes, in patients suffering from arteriosclerosis, or from some pathological condition of the heart, such as myocarditis or aortic regurgitation, or some of the grave heart affections.

The essayist stated that in order to become experienced, one must administer anesthetics. That is a good point. I have heard many remarks made by dentists here and there, saying do not do this or do not do that, and while many of these men have been handicapped, more or less, they are not wanting in experience. When one makes a statement with reference to the technic or to the solutions that are used, or regarding some of the bigger things, he should be very careful and not rush into print because it may mislead some dentist. He must be sure that he is right, but many such statements that are untrue have crept into the journals, particularly with reference

to solutions, distilled water, and technic, and these things have hurt the advancement of block anesthesia and general anesthesia rather than helped them.

As to the toxicity of the various local anesthetics, I will say a word or two about that. It has been my pleasure to do some research work along this line, and when the report is completed it will be published, but our conclusions are today in favor of procain. At this time, I wish to call attention to the fact that the federal government has changed the word novocain to procain because procain is an American word and novocain is the original German word. When novocain was made in this country it was analyzed by Professor Stieglitz of the University of Chicago and by Dr. Letcher of Cornell University, and the product was found to be identical with the original product, and articles were printed in the Journal of the American Medical Association in which it was advised to use the word procain in all the prescriptions containing this drug.

Another word to which I desire to call your attention is that of conductive. Dr. Herman Prinz, of Philadelphia, brought this out something like a year ago in an article in the Dental Cosmos in which he criticized the word "conductive". The word conduction is preferred. Personally, I prefer the term block anesthesia or nerve blocking. Conduction is a noun and it should be used instead of the adjective conductive.

I cannot exactly agree with Dr. Puterbaugh in stating that the difficulties encountered are not traced to the procain but to the methods of application. I take it from that that he means the toxicity of the drug. Procain, when injected into a patient in an over-amount will produce toxic symptoms similar to those arising from the toxicity of cocain. The symptoms are similar, but of course a greater amount of procain must be injected, but the mode of application has a great deal to do with it I grant you. Slow injection, as Dr. Schultz brought out, is an important factor in the elimination of approaching syncope or collapse. I have made it a rule to allow a second of time after each minim. For instance, if I inject two mils of solution, I will take thirty seconds, one second per minim. Even a longer period of time would be advisable or better. The injection of the solution, therefore, is a most important factor. The dentist should not allow his office assistant to make up the solution from tablets that are disintegrated, or show the girl how to do a thing which does not conform to the regulations and principles laid down in bacteriology, such as the use of distilled water that has been stale for several days, or Ringer's solution which is stale and adding tablets which have been poured out on a towel or in the bottom of the hand in the solution. All these things should be avoided, and I can only repeat what Dr. Schultz has said that the rules of asepsis must be practiced at all times. Remember in this work, if you get into trouble, if you have a case of infection following the injection, no doubt your technic is to blame, and if you have a deep-seated infection it is far different from a superficial infection. I have noted this time and again in clinics. I have observed in clinics that a dentist will use every precaution in drying the mucous membrane in the mouth with gauze, painting it with tincture of iodin, but in picking up the hypodermic syringe, I find that the area of insertion of the needle is flooded with saliva, or in carrying the needle in the flame and carrying it to the mouth it may touch the lip of the patient or tongue. Now, what is the use or sense in sterilizing the mucous membrane if you are going to overlook one of the great and essential factors that is, in carrying the needle into the tissue in a sterile condition. If the surface or mucous membrane is flooded with saliva,

the needle will carry in a few million of bacteria into the tissue.

In this work of deep block anesthesia, if you get into trouble by having infection take place, no doubt your technic is faulty. You are to blame for using that kind of technic.

I would urge you to be careful in the preparation of your solution. Be sure that it is sterile. Be sure that your iridio-platinum needle has been passed thru the flame and brought to a red heat before you enter the tissues with it. Personally, I have made it a rule never to take the syringe and carry it to the patient's mouth and mucous membrane until it has been passed thru the flame. If you place the syringe on your cabinet, you should be careful not to touch the needle with the coat sleeve, or allow your assistant to touch it, or allow the needle to come in contact with anything that is not sterile. Remember the rules of asepsis and by all means practice them.

I agree with Dr. Puterbaugh in stating that Ringer's solution is the ideal vehicle. Ringer's solution is considered to be the best, not only by a large number of men who are using a great deal of anesthesia, but it is also considered to be better by physiologists. Ringer's solution is a better stimulant and I can cite to you striking experiences.

Suppose you remove the heart from a frog or a turtle and place it in physiological saline solution at body temperature, that heart will not beat for a long period of time. After the stimulation of the physiological salt solution has worn away and each beat of the heart grows weaker and weaker, if the heart is taken out of the physiological salt solution and placed in a normal Ringer's solution at the same temperature of the body, the heart will pick up in force, the blood pressure will increase and the heart's action will be as great as it was before. If there is not something in Ringer's solution of calcium or potassium that produces this effect I would like to know. The liquid content of tissue contains a certain amount of potassium, sodium and chlorid. It is reasonable that we should use a vehicle which conforms to physiological laws and function, leaving the cell as early as possible, and we find it in Ringer's solution. I do not say that Ringer's solution is a great stimulant when injected. Inasmuch as we are taught to use isotonic solutions, why not use a vehicle that contains calcium and potassium in addition to sodium chlorid instead of employing sodium chlorid solution alone.

Another important point I wish to mention is the isotonic solution. An isotonic solution is one which conforms to osmotic value, or having the same osmotic pressure is equal to the amount of blood or tissue contained, that is, the liquid contents, in the tissues of the cells.

Another striking experiment which proves the value of using isotonic solutions can be carried out by taking three slides. Try this out some day when you have a little time with your microscope. Take three slides; place a small amount of blood on each slide. To slide 1 add distilled water, place it under the microscope, you will see the erythrocytes enlarged, and you can actually see the cells break under the microscope; that is to say, the mucous membrane which surrounds the erythrocytes will rupture and hemoglobin discharge. This shows what has taken place in the way of osmosis. Take another slide and add isotonic solution, and place a cover slip on and you can see the cells float around in the solution. Take a hypertonic solution, one that contains an extra amount or over-amount of your sodium chlorid, and place that solution in contact with the same amount of blood on the slide, and place that under the microscope and you will find just the opposite thing takes place. The erythrocytes will contract, they will give up the

salt contact because the solution which surrounds the cells is greater in its value and the natural cells give up a certain percentage until the pressure between the two is equalized. That process is known as shriveling up, and several minutes after you can see only a black speck under the microscope.

Just a word or two with reference to adrenalin versus suprarenin. Personally, I would just as soon use adrenalin as far as my own work is concerned. In fact, I would rather use it because adrenalin is an American product made by Americans, and suprarenin is made by our former friend.

I cannot agree with the essayist in saying that suprarenin is more stable, that is, synthetic suprarenin. I have not found it to be so from my experimental work and from the information I have been able to gather from a prominent man who is at the head of one of our experimental medicine departments of a certain pharmaceutical house, in saying that adrenalin can be boiled fifteen minutes without deterioration. So much has been said about throwing the solution away if it is slightly discolored. You have been told that if it is slightly pink in color, you should throw it away. I have had hundreds of dentists say to me, would you use a solution that is slightly discolored? I do not inject a solution which is made from synthetic suprarenin. In the case of adrenalin, I would not hesitate to inject the solution if it was straw colored, and if you will pardon me for saying so, I have injected gallons of that solution and never had as much trouble as I have had from the tablets which contained synthetic suprarenin.

Another point: The tablet or the solution which contains adrenalin will turn amber color or straw color, which is due to oxidation or disintegration of the vaso-constricting agent adrenalin.

Suppose you have the twelve-hundredths of a grain of adrenalin and keep that tablet on hand for six months or more, it makes no difference. Supposing that you have a tablet in distilled water which renders it straw colored or amber colored, you do not have the twelve hundredth of a grain because a certain percentage of the adrenalin has disintegrated, and the solution need not be discarded until you can see a sediment in the bottom of the receptacle. The idea of saying that synthetic suprarenin is the only agent that should be used and with which you can obtain the finest results is true, nevertheless I do not believe in saying that you cannot secure just as good results with adrenalin. Personally, I have obtained just as good results from the use of adrenalin as I have from suprarenin.

As to the symptoms arising during injection, I make practically all injections with the patient in the semi-supine position, and in so doing we can eliminate a great deal of the approaching syncope or collapse in many of those cases that are susceptible to the suprarenin. We must remember that in injecting suprarenin it is a very powerful drug; it produces vaso-constriction; it increases blood pressure, and when a patient is suffering from an advanced case of arteriosclerosis, we should inject the solution cautiously, and in such cases it would not be amiss to observe the pulse or to use the sphygmomanometer, and observe the blood pressure and pulse thruout the injection. But I say to you gentlemen that a patient has to be in a very bad physical condition not to be able to stand the injection of four or five mils of properly prepared procain, isotonic or adrenalin Ringer's solution.

Block Anesthesia, Indications and Advantages.

1. In cases in which the administration of a general anesthetic is usually difficult, as for operations upon the jaws, or plastic operations upon the face, wherein the proper nerve blocking injections are of great advantage.

2. In case no anesthetist is present to administer properly a general anesthetic.

3. In short, operations, for example local anesthesia is indicated over ether or chloroform anesthesia. However, if a general anesthetic be employed, nitrous oxid-oxygen is the general anesthetic of choice. In making this statement with reference to short operations, the reader must not be led to believe that block anesthesia is employed only for short operations, for such is not the case, as anesthesia can be maintained over a period of two or three hours, or even longer, if desired, the duration of the anesthesia being controlled by the vaso-constricting content of the injecting solution.

4. Local anesthesia is indicated in operations in which it is better to have a bloodless or almost bloodless field.

5. Local anesthesia is of great value to control postoperative pain within the operated part. Local anesthesia will block the postoperative pain or, at least lesson it until the return of sensation. Quinine and urea are employed extensively for this purpose by some operators.

6. Block anesthesia is of great advantage in general and oral surgery operations to carry the patient over a number of postoperative painful hours into comfort and without pain.

7. Patients who have been operated upon under block anesthesia can in most instances be discharged immediately, provided, of course, the operation be a minor one.

8. When nerve blocking injections are made by skilled hands, with the proper quantity and percentage of solution injected, they are not associated with any grave danger, as is the case many times if a general anesthetic be employed. This is particularly true of ether and chloroform.

9. The surgical convalescense, general physical conditions of the patient, and postoperative recovery are not so often disturbed as is the case in many instances following general anesthesia.

10. It is indicated in many cases in which it is possible to completely block all nerve communications to the part to be operated upon and render it completely insensitive.

11. It is indicated in those patients who possess a strong personal objection to the loss of consciousness.

12. In individuals who possess a tumor or growth, whereby a small section can be removed for microscopic examination. It is indicated, and many times the patients will submit to a much earlier operation under local anesthesia than if general anesthesia is employed.

13. The duration of anesthesia may be changed in accordance with the amount of the vaso-constricting agent employed. This is of great advantage for various prolonged oral surgery operations, such as the reduction of a fracture, splinting, antrum cases, tonsillectomy, impacted third molars, etc.

14. The long duration of anesthesia permits the operator to take his time with the operation which gives him the opportunity to utilize all of his skill while operating.

15. It is an advantage to the operator to have an open field during the operation, which is the case in block anesthesia, while with general anesthesia many times the anesthetic mask has to be reapplied, in order to keep the patient anesthetized for oral, throat, and plastic operations on the face. However, the reapplication of the anesthetic mask is not necessary when modern appliances are employed, such as when the insufflation intratracheal tube, or mouth tube is employed.

16. Large or small areas may be anesthetized, depending upon the nerve or nerve branches blocked.

17. Anesthesia is secured of infected or inflamed areas by blocking the

nerve branch in healthy tissue at a distant point from the operative field.

18. Intraoral nerve blocking injections, when skillfully made, are without pain because the needle is inserted into the mucous membrane and connective tissue. The extraoral injections can be made without any appreciable pain by making a preliminary injection into the skin with a fine sharp needle.

19. One or two insertions of the needle will block an operative field, depending upon the nature of the operation and the area to be blocked.

20. *Cooperation of the patient.* It is well known that this is of material advantage to the operator because he can operate with ease, and complete the operation with a minimum amount of laceration and without the inspiration of blood and mucous.

21. *Safety.* Nerve blocking, when properly executed, is in most cases safer than any general anesthetic where a deep, prolonged anesthesia is required.

22. *Control.* The operator has a certain amount of control over his anesthesia by injecting the proper amount. He also has control of the specific gravity, the isotonicity of the solution, and the amount of the vaso-constricting agent to prevent too rapid absorption.

23. *Simplicity.* Various nerve blocking injections, both extraoral and intraoral, can be easily made, provided the operator is thoroly familiar with his anatomy and the technic of injections.

24. *Efficiency.* In many cases operations coming under the domain of the oral and dental surgeon can be performed successfully under some form of local anesthesia, provided the injections have been properly made. However, in many cases nitrous oxid-oxygen anesthesia is preferable.

25. *After-Effects.* Patients who have been operated upon under nerve blocking seldom suffer any postoperative effects, such as headaches, nausea, retching or vomiting. This is of exceptionl value in case the patient has been operated upon for fracture of the jaw.

26. *Complications.* No complications follow the operation as a result of block anesthesia injections, such as pneumonia, renal conditions, hence it is most desirable in the aged.

27. *Effects on Immunity.* Ether or chloroform anesthesia greatly reduces the patient's resistance against pyogenic bacteria and pneumococci, which is avoided in local anesthesia.

28. The cost of producing block anesthesia is far less than that of any known general anesthetic.

29. Local anesthesia controls or greatly lessens the hemorrhage in the operative field.

30. If the part has been completely blocked, no traumatic surgical shock is produced.

31. If it is employed in septic cases the action on the human organism and the elimination from the system are far less than from the general anesthetic, such as ether and chloroform.

32. Local anesthesia lessons the possibility of the patient swallowing blood and mucous during an oral operation.

33. The patient can cooperate with the operator and assist with the operation.

34. The tissues can be handled more carefully, thereby lessening the amount of trauma and lacertion.

35. Nerve blocking, when combined with general anesthesia plus other factors, blocks all afferent impulses, thus bringing about anoci-association. Nerve blocking is one of the important steps in producing anoci-association.

36. Nerve blocking prevents all reflexes from reaching contiguous parts or painful impulses originating at the site of operation, thereby causing a less after-action.

37. The preoperative preparation of the other patient is not so important for

nerve blocking for oral surgery cases, as is the case for general anesthesia.

38. When a patient has been operated upon successfully under block anesthesia, as a rule, he, or she, as the case may be, will readily submit to future operations because confidence has been gained, and such patients are aware of the fact that they can be operated upon without suffering pain, and yet remain conscious.

39. It elevates dentistry and makes better oral surgeons and dentists, because with pain eliminated a better service will be rendered.

BLOCK ANESTHESIA — CONTRAINDICATIONS AND DISADVANTAGES.

Block anesthesia is contraindicated for certain operations and with certain individuals. These contraindications and disadvantages may be summed up as follows:

1. With young children, unless the confidence of these little patients can be secured.

2. On patients suffering from epilepsy.

3. Upon highly neurotic or nervous individuals whose confidence cannot be obtained.

4. For operation of a part whose nerve supply it is impossible to block without inserting the needle into inflamed or infected tissue. If the needle is inserted thru infected tissue it is liable to inoculate healthy tissue.

5. In case the patient is suffering intense pain caused by some pathologic conditions, local anesthesia should not be employed unless a preliminary sedative is given. In most cases general anesthesia is indicated.

6. Local anesthesia is contraindicated with tissues of low vitality. The additional trauma caused by injecting the solution may still lower the tissue vitality, but, on the other hand, the low vitality of the patient may contraindicate general anesthesia; therefore, after all, local anesthesia may be the method of choice.

7. With patients suffering from severe heart lesion, such as aortic or mitral regurgitation, myocarditis, with threatened dilatation, or in individuals possessing a broken compensation, or in extreme cases of arteriosclerosis, with increased blood pressure, local anesthesia is contraindicated. In case local anesthesia is employed, the solution should contain a smaller amount of the vasoconstricting agent, epinephrin, than the solution for the healthy individual. In many of these cases block anesthesia, when produced by skilled hands, slowly injecting the proper percentage and quantity of solution, is in many cases safer than a general anesthetic. With these patients local anesthetics should be given with caution.

8. When the patient has a strong personal objection or dislike in remaining conscious during the operation.

9. A patient who is anemic, possessing a lowered vitality and resistance, who is very apprehensive, often suffers mental strain, and yet free from actual pain, may pass into a state of syncope or collapse. Local anesthesia with these individuals should be given with caution.

10. A patient who has suffered considerably with some severe pathologic condition, and may be in a state of general infection, is not the ideal patient by any means for nerve blocking for the performance of a severe or prolonged operation.

11. Operations performed under nerve blocking upon pregnant women should be given the greatest consideration, avoiding all pain and mental excitement, but when this is done they are ideal patients for block anesthesia.

12. If the operator is unable to vouch for the purity of the injecting solution, or the asepsis and thoro cleanliness of the apparatus, or if he is not positive he is familiar with the technic,

local anesthesia is certainly contraindicated.

13. One of the greatest disadvantages of block anesthesia is the psychic effect produced upon the patient. As the patient is conscious he is aware of everything that is going on about the operation and can hear the conversation between the operator and his assistant; therefore, nerve blocking inhibits physical pain but does not eliminate psychic fear and strain which are removed under general anesthesia.

14. Local enesthesia should not be used for the removal of a malignant tumor unless the operator is positive it is restricted to a small circumscribed area. If the operator is doubtful as to its limitations the operation may extend beyond the area anesthetized and into tissue which would be difficult or impossible to further block with a local anesthetic, and after all one may have to resort to a general anesthetic.

15. Local anesthesia should not be used on individuals for operations of such a nature which demand a very large quantity of the solution. The patient should never be subjected to an enormous quantity of solution, especially if his physical condition contraindicates such a procedure. Nitrous oxid-oxygen in such a case should be administered.

16. Injection of the solution may cause circulatory disturbances and faintness, which may be due partly to the patient's apprehension, altho the patient in most causes blames the drug that is injected.

Dr. Puterbaugh (closing): I wish to express my appreciation of the kindly manner in which you have sat out this long seance this afternoon, and thank you for the delicate manner with which this subject has been handled by the men who discussed it.

As to the isotonicity of solutions, that, too, is variable. If Ringer in his extensive experiments and physiologic work says that which would be isotonic for Bill Jones would not be isotonic for John Smith, there must be an individual variation in the isotonicity of the preosmotic balance between the tissues of various individuals and animals. So there is no definite formula, and for that reason we will find considerable variation in the different formula given for the so-called Ringer's solution, and Ringer's idea was that we should use a solution that approximated that of the body fluids. Then you are doing much better than you would do if you did not use something to bring the osmotic balance up in some way in order that the tissues swell.

I did not mean to convey the idea that you cannot use conductive anesthesia in abscessed conditions. I meant this, that we, as dentists, must see more than the tissues we operate upon and the tissues to be anesthetized. We must see the patient, and a patient who comes to you after having been distressed and suffering pain for one or two days with an abscessed tooth is not in a condition to go thru mental torture, let alone physical torture, and for that patient gas oxygen is the ideal anesthetic. The same is true of third molar impactions, where you have partial locking of the jaw; you can give the patient gas oxygen, you can pry the jaws apart painlessly, and you can do your operative work. You must think of the patient as a patient and not of the teeth as a certain case.

Dr. Schultz mentioned in his discussion that I did not make clear my idea of the formation of an ischemic ring or barrier in the insertion of the needle and the injection of the solution. What I meant to say was this, that if on the insertion of the needle to the point where

you wish to leave the anesthetic solution you will inject one or two or three drops, and wait a few seconds until vaso-constriction is produced about the area where you wish to deposit the solution. and then make your injection, you will have constricted down the arterioles and the venules that carry the solution over the body; you have contracted them down until the solution will be isolated or confined to that area, and it not only intensifies but prolongs your anesthesia, and it prevents systemic intoxication either from the novocain or from the adrenalin.

As to the statement made by Dr. Whipple, I will say I have reference to gas oxygen, saying that anesthesia might be maintained for five or ten minutees without serious danger, and my idea in saying this was that the longer we maintain general anesthesia, the more you increase the mortality. In other words, if you wish to carry gas oxygen in your practice you may administer it for five or ten minutes with practical impunity and you will not be endangering the patient's life. This danger, however, increases in geometrical proportion to the length of time you maintain any general anesthesia.

I sincerely hope that those of you who have been physically able to sit out this discussion will go home with a firm resolution not only to try out local anesthesia but general anesthesia, that you will use anesthetics more than you have done in your practice, and as you use them more and more confidence will come to you, and it will prove a great boon and satisfaction to your work, and you will do a better grade of dentistry than you can possibly do without anesthesia.

RESPONSE TO THE ADDRESS OF WELCOME.

By J. P. Buckley, Ph. D., D. D. S., Los Angeles, Cal.

(Delivered before the National Dental Association at Its Twenty-third Annual Session, New Orleans, La., October 20-24, 1919.)

Mr. President, Gentlemen of New Orleans, Fellow Members of the National Dental Association:

Ladies and Gentlemen—

I KNOW that I express the feeling and voice the sentiment of this large audience when I thank these gentlemen for their warm and earnest words of welcome; and I can say to them on behalf of the National Dental Association, an organization composed of over 25,000 members and represented here by delegates from fifty-eight different state and territorial societies, including the Army and Navy, that we come to this city to hold our twenty-first annual meeting because we love the southland, and know in advance that we should receive here just such a welcome as has been extended. I know whereof I speak when I say that the hospitality of the south is as free as the air and the sunshine, and while New Orleans has a history peculiarly her own, so far as hospitality is concerned, we have long known her to be typical of southern cities.

We came here, too, at this time because one of your distinguished citizens, Lieut. Col. C. Victor Vignes, is our honored president, and in his official capacity will preside over and guide the destinies of the Association at this meeting. And, like all thoughtful and serious minded people of today, we assemble this morning with our faces toward the rising sun, for we are deeply appreciative of the fact that out of the chaos of the warring world and the whirlwinds of wrath, *peace,* sure and certain, has come at last. The Germany that fared forth upon bloody roads to lay the nations of the earth conquered at her feet, is now humbled to her knees and has signed the iron, but just, treaty. Thus has ended the fiercest, bloodiest war in the history of man--a war which cost in human lives seven million of the very flower of world; and, in dollars, two hundred billion, or over one-fourth of the entire estimated wealth of the world—a war which engulfed thirty nations in its cruel clutch and, for nearly five years, threatened and shook the very foundations of our civilization.

But we are so happy this morning to know that at last we are privileged to stand back where we can see above and beyond the clouds, where we can observe the radiant sunshine with its stimulating rays and its elevating influence; and, from this vantage point, we see that the sons of men have again sheathed the sword and put their hands to the plow in long deserted furrows. If any of us in the dark and gloomy days of the past five years doubted for a moment, we know now, as we never fully realized before, that God is good, omnipotent, supreme; truly God is in his heavens and all is well with the world. Once more the skies are free of battle smoke, the rivers flow clear again, bright and limped to the sea—no blood upon their waters. There is no flame upon the ramparts; the iron throats of the guns

are silent, we hope and firmly believe forever.

Again the earth swings clear in its orbit and we can now look up and behold the light Night, with the horror of its dreams, is past; we thank God it is morning and the full dawn. But yesterday fear still lurked in the shadows; but that fear has gone now and the shadows are lifted. The thrush and the meadow lark are singing their sweet songs in Flanders fields; old men and women and little children are sitting in the sunshine. Today no man need dread to set his feet upon any high roads of the world; no ship need fear the pathways of the sea. Peace that is real is here—peace that no hand is strong enough to break. And, oh! my friends, it is a peace worthy of the dead who died for it. Not in vain now are those seven million graves where their hearts are dust, who were the flower of the world. They sleep well, for their faith has not been dishonored.

My friends, did you ever stop to realize and fully appreciate that every peace that was made before was made merely that the soldier might have a breathing spell, that the broken swords might be mended, that the guns could be given time to cool? Every treaty that was made before was made that kings might go back to their bloody thrones to hatch new plots, and that the courtiers of kings might plan new crimes against humanity. No king sat at the peace table in Versailles. There were no crowns on the heads of the men who wrought this treaty. The windows were not barred in the house where the deed was done. Even the shadows of the little peoples of the world fell pleasantly and welcomely across the sunlight of its open doors, and, my friends, while the clouds roll and the dew drops fall; while the grass grows and the rose bud reflects the blushes of the rose; yes, as long as the grapes continue to grow purple by the kisses of each autumn's sun, the names of the men who wrought this treaty will not be forgotten. Far above all other names that time has inscribed on its eternal scrolls shall the names of Wilson, Clemenseau, Lord George, and Orlando, be inscribed. For these men have achieved in stubborn honesty and high faith the most supreme accomplishment in all history. Oh! my friends, Plato's dream was not in vain; nor was it in vain that a cross was raised on Calvary.

As we turn, then, this morning to the consideration of the post-war problems of our own profession and join with others in the various walks of life in the work of reconstruction, let us pause for a moment in our deliberations, at this, the first session of our victory meeting, to pay a just tribute to those who willingly offered and gave their lives that you and I might live to enjoy the rich heritage of this glorious peace. And let us write in our memories, in burning thoughts of red—that we may never forget, that it was for more than country, grand as that would have been, for which our boys fought in this world war. They fought for *real Americanism*, that brand which wears no shackles at the wrist, which strives not for the world's wealth, but for its weal. Real Americanism is that deeper, truer, broader feeling which animates the soul and beams from the hearts of men; it is that peculiar something from within that manifests itself for truth and justice whenever humanity clashes with humanity. Real Americanism is a courageous, red-blooded Americanism that fears not to go where duty calls, tho it be to the ends of the earth. Real Americanism does not fear death on some foreign shore; it fears nothing but dishonor. The real American mother, God bless her, is of that Spartan breed that bade her son return "with your sword or on it." She never joined in the chorus when the pacifist sang "I didn't raise my boy to be a soldier."

Real Americanism assures every free people of the earth, however weak, who

are attacked by despotism, that they may count on the aid and support of the American republic.

America fought in Cuba for the freedom of a people who were not our own; America fought in China when the Boxers threatened anarchy; and so in this world war, when Germany became the international outlaw, America sent her boys across the sea following the old flag. Ah! you old flag of ours—born out of the struggles of the Revolution; baptized in the blood of a noble ancestry; emblematic of a free and an independent people—when unfurled to the breeze, you wave today just as you have ever waved, unsullied and unstained—the emblem of our nation's dignity and honor. And so our boys followed that old flag across the sea, carrying the ideals of their American mothers in their hearts; and thousands are sleeping over there today where the cohorts of liberty mingled freely amidst falling thrones and crumbling dynasties; many found their last resting places in the haunted depths of the deep blue sea.

Liberty, for which they fought and died, knows no country; it is the rich heritage of the race; foe alike to anarchy and despotism. And as long as the republic endures American graves in France will be sacred shrines. Honoring the heroic dead and paying our debt of gratitude to the survivors of the conflict will be one means of perpetuating the principles for which the great war was fought and won. And what, let me ask, does the winning of this war mean? It means everything, my friends, everything. Briefly, in closing, I will say that it means this: that America, your country and mine, has securely won her place among the great powers of the world; that American institutions, which we serve and love, have withstood the severest shock by which a government was ever tested; that American industry, upon which we depend for our prosperity, our happiness and our all, is entering upon an era of reconstruction such as will dazzle the world. The whole horizon is breaking into a broad expansive smile of welcome to the people who dare, and it is written among the stars that these people inhabit the United States of America.

Again, gentlemen of New Orleans, on behalf of the National Dental Association, I thank you, and back of you, the people whom you represent, for your generous, your wholesome welcome.

CLOSER COORDINATION IN LABORATORY AND CLINICAL INSTRUCTION IN OPERATIVE DENTISTRY.

By Robert E. Blackwell, D. D. S., Chicago.

(Read before the American Institute of Dental Teachers at Atlanta, Georgia.)

IN THE consideration of the subject of Operative Dentistry, we are reminded that the "American Institute of Dental Teachers" is an outgrowth of an organization founded for the purpose of studying more closely the problem of teaching this technical subject; of unifying ideas of principles and practice in operative dentistry; of standardizing dental technics and methods of teaching.

Since the founding of the "National School of Dental Technics" twenty-six years ago, the scope of the organization has been broadened until now it includes in its program every phase of dental education. But technical procedures and methods of teaching them should and will be given a prominent place so long as teeth decay and do not repair themselves, and so long as man exercises his ingenuity in the discovery and practice of methods of making repair.

The aims of the earlier organization have been realized in quite a large measure thru discussions and technic exhibits, and yet our methods are not perfect. The addition of a fourth year to the course in dentistry makes possible the development of a higher degree of technical skill and a clearer understanding of the subject, which we hope, will be accompanied by greater perfection of method.

Cavity preparation and other technical procedures have been so systematized and simplified that we, as teachers, should not be satisfied with anything short of a complete mastery of the subject by the student. Perhaps it would not be far amiss to think of the system of technical procedures as a heritage to which every student entering our halls is enlisted. We are executors of a vast estate to which every student is heir. If we fail to do our full duty of office, we shall allow the life work of a great man to go for naught and the student to lose his birthright.

The system of cavity preparation, as we try to teach it, is based on a knowledge of the cause of dental caries, its places of beginning, progress, and limitations; on a knowledge of the anatomy of the teeth and their juxtaposition in the arch; on a knowledge of the soft tissues in health and disease; on a knowledge of the calcified tissues and how to cut them with ease, rapidity, and the least amount of pain to the patient.

In order that the student may get an early start in his technical training, it is customary to subordinate etiology for a time to the mechanics of repair; and very likely that is a proper expedient. But something of the cause, progress, and limitations of decay can and should be taught in connection with the laboratory work.

Every opportunity to create interest in work, which may not appeal to all as being especially attractive, should be grasped and emphasized. For this reason, advantage should be taken, on every possible occasion, of giving the

student a glimpse into the future that he may be imbued with the idea of service to people as early as possible in the course, and come to a full realization of his opportunities and responsibilities.

Since we have had laid out for us such a well defined system in technical procedure, a method should be found of teaching the system with such thoroness that there can be no question about its success. The laboratory courses in dental anatomy and operative technic should be so planned that the student may begin his infirmary practice during the latter part of the second year. Such a program contemplates the completion of the laboratory course in dental anatomy and an elementary course in operative technics in the freshman year; the course in dental anatomy to consume the first two quarters, or twenty-two weeks, and the course in operative technics the third quarter, or eleven weeks. It is considered imperative that dental anatomy should be the first subject taught under the general head of operative dentistry, as the nomenclature taught in connection with this course is essential to a clear understanding of what is to follow in both operative and prosthetic dentistry; and a knowledge of dental anatomy is vital to a comprehension of our modern ideas of cavity preparation.

Operative technics proper should begin in the freshman year with the study of instruments, principles of cavity preparation, fillings, and treatments. The subject should be carried into the sophomore year with emphasis always upon the teaching of a system, that in the work of the two years previous to the infirmary practice such knowledge of fundamentals shall be gained, and such habits of procedure formed, that clinical operations will be comparatively easy. A thoro knowledge of the cutting instruments and the use of these as excavators is so important a part of the system that it seems justifiable to go to any length to obtain it.

Our Freshmen reproduce in brass the entire college set of forty-eight cutting instruments. In doing this, they naturally associate cutting edge, blade, and shank with the formula. The metric system, upon which the formula names are based, becomes familiar thru use, and the student's eye is trained to recognize each instrument without reference to the formula stamped on the shank—a very decided advantage. Then the mechanical work itself is in harmony with the general scheme of training the hand and eye. At the conclusion of the instrument making, it is our custom to give a practical examination in the subject, at which each student is handed various instruments of his own make and required to give the formula and use of each. No detail, however slight, is, or should be, left out.

Following the study of instrument forms and formula, cavity preparation should begin. Several materials, such as bone, ivory, and vulcanite, have been used, but none is so satisfactory as an extracted tooth. Ivory, or even bone, may be sufficiently like dentin to do very well, but there is no material that closely resembles enamel. An effort should be made to secure a large number of freshly extracted teeth which should be kept in solution continuously until used. Teeth that have dried out are not satisfactory in that they become so brittle and so hard that the enamel is broken away on unnatural cleavage lines, and the dentin can scarcely be cut at all with hand-instruments. When dried teeth are employed for this purpose, practically all of the cutting must be done with burs and stones, so that no benefit is derived from the use of hand instruments, and no knowledge gained as to the real character of the material.

At this time, something of the etiology

of caries should be explained. Here the laboratory may be used to great advantage in supporting the work of the class room. Each tooth should be examined for places of beginning decay and the marks of its progress. A large number of teeth with small beginning cavities showing whitened areas where the enamel has been etched may be selected. The beginning places of these decays and frequency of their occurrence should be pointed out, and the factors of limitation of their growth studied. Teeth with beginning decays are ideal for cavity preparation.

It frequently happens that much of the history of an extracted tooth may be read from its surface markings, which affords a splendid opportunity of arousing interest and directing thought along useful lines. Most of the extracted teeth containing fillings which come to the laboratory show recurrence of decay. No better chance of impressing upon the student the importance of correct outline form could be hoped for than is afforded by an examination of these failures. At this time may begin a study of conditions which will lead to the practical application of theories governing extension for prevention.

During the first work in cavity preparation, with extracted teeth for material, much of the cutting may be done with hand instruments, but it does not seem feasible always to insist upon the use of the particular instrument which would be used, were the operation a practical one. The tooth should be mounted upon a wooden block with the root imbedded in sealing wax so that it may be conveniently held in the hand or put in a vise. For this reason, instruments of simplest form seem best to use. The objects in view at this time are a knowledge of the character of the materials, the best means of cutting them, and a thoro schooling in the fundamentals of cavity preparation. It is our aim to teach cavity form in relation to tooth anatomy, paying particular attention to outline, resistance, retention, et cetera, so that the student has a clear conception of form, but not necessarily of instrumentation and method. The mastery of these latter for cavity preparation during the first year seems neither practicable nor essential.

The enamel should be given especial attention. The preparation of the enamel wall with due regard to the natural cleavage lines, the planing of the walls, and the beveling of the cavo-surface angle with keen edged instruments, is of paramount importance.

It will be necessary to give each student a great deal of personal attention during this early technical training. The care of the Arkansas stone and the sharpening of instruments should be taught by personal demonstration. Each student should be required to have conveniently at hand, an Arkansas stone not less than two by five inches in size, clean but well oiled. He should be taught the methods of sharpening the various instruments, and his attention should be called again and again to the absolute necessity of re-sharpening when the edge has become dulled. Too much emphasis cannot be placed on the importance of sharp instruments and the method of keeping them so.

Outline form should be determined by surface markings whenever possible, as has previously been mentioned, and the subsequent steps carried out with strict regard for correctness of detail. Large models of ideal cavity preparations should be conveniently placed for inspection and comparison.

The laboratory work of the sophomore year is so planned that the student should be able to enter the infirmary at the mid-year or, at the latest, the beginning of the third quarter. Cavity prepa-

ration, fillings, and treatments are continued, extracted teeth being used exclusively, but no longer isolated. It is now very desirable that the student learn to operate under difficulties. Several schemes have been suggested, but with us a manikin has proved quite satisfactory. This device is an occluding frame similar to the "Snow," which is mounted on a standard that may be easily attached to any table. Trays which accommodate the teeth are fixed to the frame. Teeth made of vulcanite may be purchased for the outfit, but are valuable only as "fillers" for the arch. The teeth are held in place by a combination of wax and vulcanizable gutta-percha which permits of some mobility and also makes it possible to substitute one tooth for another when it is desired. A manikin is assigned to each student and he is instructed to set up his vulcanite teeth in their proper alignment and occlusion. These teeth are not of perfect form, but do fairly well for this purpose. If the operation is a mesio-occlusal cavity in a lower first molar, for instance, the vulcanite tooth is removed and a natural one put in its place. Then the proper burs and cutting instruments are laid out in the order of their use, the rubber dam applied, and the operation is begun.

The systematizing of instrumentation for cavity preparation is of the utmost importance in connection with this work on the manikin. The student should be shown that a little time taken now in preparation for practical work will result in better and more rapid operating; that system is the keynote of operating efficiency. Students should not be permitted to go about their work in a haphazard way and receive credit for results obtained without regard for method. To be sure a good result is desirable, but during the period of development of technical skill and the formation of habits, method is even more important.

Naturally a great deal of the success or failure of this work depends upon the instructors. There should be at least one instructor to every fifteen men, and he should be alert and watchful. The manikin is so constructed that the occlusal planes of the teeth may be placed at any angle. This may be a decided benefit or detriment to the ultimate success of the method, according to the sincerity of the operator and the watchfulness of the instructor. This is the time and place to work out, in addition to instrumentation in cavity preparation and technic of filling, such details as positions at the chair, direct or indirect light, proper angle of the occlusal planes of the teeth, finger positions, use of rubber dam, matrix, and separator. Root-canal treatment and fillings may be done under conditions very similar to those of the mouth, but this work is of little benefit unless all the precautions as to surgical cleanliness are strictly observed.

Sealing operations may also be performed on the manikin which will prove to be of practical benefit to the student. Cement may be deposited about the necks of teeth to represent calculus, or extracted teeth having deposits of serumal calculus near the gingival line may be placed in strategic positions in the jaws of the manikin and the deposits removed with scalers. Finger positions may be learned and dexterity in the use of scaling instruments may be acquired in this way, which will be very beneficial to the student especially in his first clinical practice.

Habits of practice may be formed in the laboratory which will be lasting, and if they are correct, will be of inestimable good. For this reason the student should be encouraged to think of the manikin as a patient, to use as much care in the operation as tho the subject were animate, to be cleanly, orderly, and systematic.

Textbooks with illustrations, charts, and models should always be at hand for reference. Every student should be supplied with a list of formula names of instruments for each cavity preparation —preferably on a card which may be kept constantly before him.

Our requirements for operations to be performed on the manikin are four occlusal cavities, two to be filled with amalgam; six proximo-occlusal cavities, two to be filled with amalgam; one with gold foil, and two with gold inlays; one proximal cavity in upper incisor, one proximo-incisal cavity in upper central; two root-canal treatments, one in a molar and one in an upper bicuspid; and some selected scaling operations. All unfilled cavities must be sealed with base plate gutta-percha between laboratory periods. If this work is done systematically, it will usually be done well and should afford adequate preparation for infirmary practice.

All the instruction in technical procedures may be simplified and clarified by the use of large models. Both the laboratory and the infirmary should be liberally supplied with such teaching models. The advantages of such an exhibit are many. Much of the detail which would not be noticed in natural teeth can be made immediately apparent to even the untrained eye. Many textbook illustrations may be reproduced in models that will command attention and careful scrutiny while the printed picture would receive little, if any, consideration. It has been observed that upon examining these models, students, some of them of the indifferent sort, become critical and begin to question the form of a cavity or mode of procedure. In short, interest is aroused that probably could not be gained in any other way.

An exhibit of large models showing correct technical procedures and cavity preparations is an indispensable part of our teaching facilities at Northwestern University Dental School. It is a silent, but constant and efficient teacher that makes no mistakes.

I beg to call attention at this time to the models which are on display in the exhibit room. In addition to some of the more usual presentations of typical cavity preparations and method of filling, you will find sections of teeth and cavities showing the relation of the cavity to the pulp, the thickness of enamel and the depth of the cavity in the dentin; sections showing the retention and convenience form in cavities of various classes; instruments fixed in the positions for use in excavation and filling; the correct relation of cavity margins to the proximating tooth; and some of the common errors in cavity preparation and how to correct them.

Too much emphasis cannot be placed upon the importance of an exhibit of large models. In our clinic the exhibit occupies a glass case in the center of the room where it attracts constant attention. It is only a few steps from the most distant chair so that a student may go to it while in the midst of an operation and be reminded of the correct form or method. Also, a demonstrator, finding a student uncertain as to correct form, or in error, may call his attention to the teaching model illustrating the case and in a very few minutes make everything clear to him. The models are guides to both students and instructors. The latter should be encouraged to work with the casts and make additions to the exhibit. It is splendid training.

A great deal of credit is due the University of Iowa, College of Dentistry, and to Dr. Volland, for work that has been done along this line. It is in every way meritorious.

Such models as we have mentioned will often succeed in conveying an idea when all other methods fail. Not long

ago a dentist of considerable prominence sent a cast of a lower first molar tooth, enlarged about five diameters, to a member of our faculty, with a request that he prepare an ideal mesio-occlusal cavity for an inlay and return it. The cavity was prepared, but before it was returned, a model of the second bicuspid was made and placed in position proximating the molar. The relation of the buccal and lingual margins of the cavity to the distal surface the bicuspid was correct. The case was then returned to the dentist with a brief note stating that such an ideal cavity could not be shown without the proximating tooth for a guide to correct outline. In acknowledging the receipt of the model, the dentist stated that he had learned for the first time how the outline form of such a cavity should be determined. This man is a student and a conscientious dentist, who probably is as familiar with Black's Operative Dentistry as any of us, and yet he did not grasp the great principle governing modern cavity preparations until it was presented to him in the manner just described.

If we are to teach a system of operative dentistry, it is immediately apparent that all in any way connected with the teaching of that system must give it the same interpretation. The instructors in the laboratories and demonstrators in the clinic must be schooled in the system until the routine procedure is a matter of habit with them. There will always be differences of opinion on unusual cases, but the technic for the more common operations should be so well worked out that each demonstrator would use the same instruments and give the same advice as any other. The same technic that is taught in the laboratory should be followed in the infirmary. Laboratory instructors should know so well what the clinical instructors are doing, and vice versa, that there will be little, if any, discrepancy in methods. If the laboratory instructors spend part of their time as clinical demonstrators, as is the case in our school, there will be no discrepancy in methods.

In order to insure unified teaching in this subject, it has been our custom for some time to hold quiz classes and clinics for instructors. Definite assignments for recitations are made beginning with the dental anatomy, making a thoro review of that subject and continuing thru the operative dentistry. These classes are conducted as recitations, but discussion leading to a clear understanding of the subject and the maintenance of interest, is encouraged. Coupled with this work, and probably still more important from a practical standpoint, is a clinic for demonstrators, which is held weekly. Patients are selected for the most part from the student body, as they are perhaps more easily controlled than others; and one demonstrator is appointed to operate, and another to assist at each clinic. The others present make notes and criticise the operation. The finer detail of cavity preparation and gold foil technic is carried out in this practical manner, and is bound to be greatly beneficial to the demonstrators themselves, and doubly so to the students who will reap the benefits of unified teaching.

It has been observed by many teachers, particularly those who have given much time to clinical instruction, that there is a weak place in the connection between the laboratory, class room, and clinic. With the idea of strengthening this connecting link, we have developed an exhibit of teaching models adapted to both laboratory and clinic. Much improvement has been made in the work of our students since these models have been in use. Therefore, we beg to suggest that similar exhibits, adapted to the needs of each school, be employed, with the hope and expectation that

closer coordination may be effected and the instruction in operative dentistry made easier and better.

Discussion.

E. H. Bruening, Omaha.

The adoption of the principles laid down in this paper by the schools represented in this meeting would do more to develop better dentists than any other subject under discussion.

It has been my pleasure and privilege to visit twenty-six of our dental colleges in recent years and I was both surprised and disappointed to find how poorly this matter was handled in most of these institutions. The materials for demonstrating purposes, such as models, charts, diagrams and manikins were either missing or inadequate. I do not believe the professor of operative dentistry makes it a practice to follow his lecture work into the laboratory to see if the young demonstrators employed there are taking the trouble to teach the principles he has laid down or whether they have the material at hand to teach with.

Doctor C. E. Woodbury, who is in charge of gold foil work in our clinic, reports that he now has the best class he has ever had and it is due to the fact that we began four years ago to "coordinate in the laboratory and clinical instruction in operative dentistry." There is no question as to the benefit of the results to the student because it makes his work in the mouth easier, he enjoys it more and consequently is more interested in it; to the demonstrators in the clinics because they can do more work with much less effort, particularly nerve strain, and to the patient because he gets better treatment in less time.

I have no criticism to offer of Doctor Blackwell's plans or methods. I only want to emphasize them and ask the members of the Institute to examine carefully into their systems and see if they cannot make better and closer connections between the laboratory, lecture room and infirmary.

TEACHERS AND TEACHING.

PRESIDENT'S ADDRESS.

By A. W. Thornton, L. D. S., D. D. S., D. D. Sc., Montreal.

(Read before the American Institute of Dental Teachers at Atlanta, Georgia.)

IF I UNDERSTAND aright the Genesis of this organization, its first aim was to create a kind of clearing house for the exchange of ideas concerning certain technical operations pertaining to the Profession of Dentistry, with the two-fold object of developing a high standard of technical efficiency and establishing this higher standard in as many of our schools and colleges as possible. The object was a worthy one, and I imagine that no one will question the fact that this two-fold aim has to a very great extent been accomplished. The achievements of American Dentists and American Dentistry along technical lines have been almost universally recognized. But in process of time, a broader field was entered upon and pedagogy and pedagogics gave scope to imagination and an opportunity to discuss everything, from the pronunciation of the name of the Society, to the perfection of a four year curriculum.

In recent years, we have had presidential addresses dealing with such subjects as:

1. Post-graduate Teaching.
2. The Relation of the Teaching to the Examining Body.
3. The Four Year Curriculum.

All these things are important, very important, but as "the greatest study of mankind is man", so it has appeared to me. A short time might be advantageously spent on the two most important factors of a teachers' institute, viz: The teachers themselves and the work in which they are engaged.

Let me ask a very simple question: "Why are you men here?" Because you are good Dentists? No. Because you know Dental Anatomy or Dental Histology or Dental Pathology or Dental Prothesis? No. You are here because you are teachers. So far as this Institute is concerned, that is your only excuse for being here. Let me ask another simple question: "How many of you would want on your Faculty, a Professor of Prosthetic Dentistry who had never read a book on the subject, or a Professor of Bacteriology who had never stained a slide nor seen a pathogenic organism thru a microscope?" And yet I fear, that on some of our Faculties we have men who have never read a book on Teaching or taken any instruction at an institute where students are taught to teach. So far as this Institute is concerned the business of the members is "Teaching" and we should strive to know as much as possible of the work which we undertake.

What is a Teacher? The answer of course is easy. "A Teacher is one whose business it is to teach." But what does "to teach" mean? "To teach" is to "instruct", "to cause to know." So then, a teacher is one who causes another person to know something, that the other person did not previously know. So the word

Teacher implies two persons, the teacher and the learner. The amount which any one of us teach is measured absolutely by the amount which the other person learns.

If some day you are curious to know just what a lecture period has actually accomplished, stop the lecture ten minutes early, have the students close their note-books, then ask some member just to tell in his own words what he has learned from the lecture. The result of such an experiment might possibly surprise some of us. Just here, let me draw attention to a statement frequently heard when a question is asked, "Oh, I know alright but I can't explain it." Do not be deceived by any such statement. No one knows any subject or any fact as it should be known, until such person is able to tell about it.

Most thoughtful teachers are convinced that no student can make knowledge his own without an effort, cannot add to the sum total of his store of knowledge by mere hearing. Most of the experienced teachers know, because of their experience, that no student knows a subject until in some way he is able to reproduce it, by telling of it, by writing it, by shaping or fashioning it in some manner which demonstrates that the subject has been woven into his intelligence, has become a definite part of his mental equipment.

With this thought before us: that teaching implies at least two persons, a teacher and a learner: these two persons interested for the time being in the same subject, and that at the end of the lesson or lecture period, the learner has made his own some knowledge that he did not previously possess, let us ask how is the attainment of this object usually attempted?

1. By purely didactic effort, i. e. a teacher talking on some subject for an hour, more or less. But we must always bear in mind that "talking" is not "teaching."

2. By assigning a lesson and conducting a "quiz" on a lesson, presupposing that all members have studied the assigned lesson.

3. By taking a text-book, reading a paragraph or page to a class and then trying to explain to the class what the author meant.

4. By throwing pictures on a screen with a projecting lantern and trying to explain the pictures, etc.

5. By combinations of any or all of these methods.

Any of these methods may be used to advantage. But to use the same method for every subject and every lecture period, is nothing less than a crime. The man who reads an hour's essay every time he enters a class room and imagines that he is "teaching" has still much to learn. It will not be very long until typewritten copies of these lectures are for sale and then, attendance at lectures is for the sole purpose of having attendance recorded. This is a lazy man's method.

In many of our college announcements, much is made of the fact that frequent quizes are conducted. A "quiz" as I understand the term, may be a good teaching exercise or it may be the variest waste of time. If by a "quiz" we mean a discussion between students and teachers of a subject, with the object of making clear and distinct the student's knowledge of that subject, which perhaps up till that time he has not been able to completely master, all well and good: or if it is conducted with the object of correcting any false ideas that may have been gathered from a previous lecture, a "quiz" may be a valuable teaching method. But if by a quiz, you have in mind a kind of catechetical exercise in which a teacher propounds

certain questions from a quiz compendium and the students answer these questions, having learned the answers out of a book used by the teacher or some "key" to the book of questions, such teaching in my opinion is an insult to a student's intelligence.

Dr. Thomas Arnold was perhaps the greatest teacher that Britain ever produced. By this I mean that he exerted a greater influence on the intellectual and moral life of Britain, than any other individual teacher in the Empire. Dean Stanley says of the teaching method of Dr. Arnold, "His whole method was founded on the principle of awakening the intellect of every individual boy." I want to ask some of you men here, how much intellect was awakened by some of your "quiz" masters whose exercises were begun, carried on and finished within the confines of a quiz compendium?

The use of a text-book by a teacher in a lecture room is a practice that certainly should not be encouraged. Students do not come to a lecture room to hear a teacher read from a book, which in all probability they themselves possess, nor to look at pictures on a screen which they can study to better advantage from the text book during home study. Textbooks the teacher must have, but only for preparation. A man, to teach any subject, must read everything possible on his subject and think and select and strive to illustrate and then saturated with his subject, come to the class and in simple direct language, give to the class the well assimilated material which in very truth has become his own. Listening to such a man teach, students forget for the time being that he is simply a medium of communication; to them, he is the very fountain of knowledge.

In a book on Teaching and Teachers, which I read a short time ago, I came across this significant sentence, "It is folly to endeavor to make ourselves shine, before we are luminous."

Just a word about the use of a lantern in teaching. Occasionally for some special subject, a lantern slide projected onto a screen may be a valuable aid in teaching. But the almost universal knowledge of photography and the easy production of lantern slides has made the use of the lantern a very easy method of filling in a lecture period with a hybrid production: a kind of cross between a scientific essay and a cheap movie. Whenever you use a lantern in your lecture, you lose some of the great essentials of a well taught lesson. Because the room is in darkness, discipline is to a very great extent lost, the teacher becomes a voice only, the student loses the enthusiasm of the techer's presence, the teacher's face, the teacher's eye: while the teacher loses the inspiration which comes from the fixed gaze, the attentive bearing or possibly sometimes, the look of doubting incredulity which is so often observed, first on one face, then on another, in an interested class.

Notwithstanding anything I have said concerning "methods" of teaching, we must never lose sight of the fact that the method is always subordinate to the man.

A teacher influences more by what he is six days of the week than by what he says in one or two hours of the week. In view of the plasticity of the material with which we are dealing, how careful we should be of the impressions which we make.

I have the most profound respect for the men who constitute the membership of this Institute. To an extent, perhaps not fully recognized, the tremendous change which has come over the profession of dentistry in the past twenty-five years has been brought about very largely by this body. In view of the herculean tasks still to be accomplished, how essential it is that something more than adeptness in technic or brilliancy

of intellect should characterize the men who are filling the ranks of our faculties.

A young man of very ordinary ability but of good morals and with a vision of what he is called to do, may by study, by training, by careful oversight, develop all the qualities necessary to become a successful teacher. But a man of loose morals, of unclean mind, of filthy tongue in any school, is a center of pestilential infection, and such men are usually of that class from which little improvement may be expected, as they are usually thoroly satisfied with their own superior wisdom.

Regardless of the method or methods which you may adopt, there are some things which cannot be left out of the account by any man who calls himself a teacher.

First, there is preparation. By this I do not mean that a man writes a series of lectures on a subject, has them typewritten, numbered, 1, 2, 3, 4, etc., and then uses these until they are yellow with age, dog-eared with use and "holey" where they are folded. No. By preparation, I mean reading and thinking, gathering and sifting, illustrating and changing, until "The best you can do will be the worst you will do."

To be a teacher is to be a student: to be a student is to lead a life of self-denial: it means giving, not getting: it means in most cases to be underpaid for the time and labor spent—but—if you have a vision, it means to inspire those whom you teach: to live again in the lives of the men who go out from our schools: and it is worth while.

It is necessary to know what to teach as well as how to teach. Teach principles, not trivial, wearisome details. Let me give you an illustration of what I mean by this. I listened once to a man give a lecture on condensed gold fillings. He described everything from shaking hands with the patient, to the final touches of the toilet of his cavity. Then he said, "I would put the first pellet in at this point, the second pellet here, the third here, and the fourth here, pointing out the location of each pellet on a large drawing of a prepared cavity. Going on, he said, "I would put the fifth pellet here: then he stopped, considered, looked thoughtful: and turning to the audience (a convention of dentists, by the way,) he said, "No, I wouldn't put the fifth pellet there, I would put it here" (indicating a point about a M. M. from the first location). Of course it was "Camouflage" pure and simple. He forgot the "principle" in his attempt at exactness: his high explosive was "dud."

There is an old saying that "Honesty is the best policy." In teaching, "honesty" is not a policy as that word is usually understood, honesty is a cardinal principle. Do not attempt to teach what you do not know nor to explain technical operations which you are not prepared to demonstrate. To explain: In one of our colleges, there was a *Demonstrator*. Complaint was made by the students that this particular Demonstrator did not demonstrate: he talked about how things should be done or were done, but never did these things himself for the students. When he was spoken to by the head of the department, he acknowledged very frankly that what the students said was true. The reason he gave for this "refusal to demonstrate," for he persisted in his refusal, was, that he might make a failure of a demonstration or he might have an accident, and he could not afford to "fall down" before the students. I need hardly say that such a man should have no place on a teaching staff. He failed to realize that his failure, if he had one, might be used to draw attention to some faulty step in technic or that his accident might be used to show a method of repair. What that demonstrator did accomplish most perfectly was that he lost the confidence and respect of the

entire class. Just a few words about the party of the second part, "the learner."

When all is said and done, the success or failure of our teachers and teaching, the right of our schools and colleges to exist and carry on their work, must be determined by the finished product of these institutions, the graduates. A number of questions have arisen during the past few years, in connection with our work, and all thoughtful men recognize that the present is a momentous, transitional, psychological period in the evolution of our professional status. Is dentistry a specialty of medicine? Should a man, before being given a license to practice dentistry, be compelled to possess a degree in medicine? Should the course in medicine be so arranged that a man would be able to obtain a degree both in medicine and dentistry in five years, and should this standard be adopted by all our dental schools?

These questions are continually coming to the surface, and I believe that this Teachers' Institute must be the court of final appeal in settling these matters. And in this settlement, a review, a close study of the past must of necessity be a potent factor in determining the conditions of the future. Let us here and now ask ourselves honestly: are we satisfied with present conditions? Are we proud of the men who graduate from our colleges, of the service which they render to the public, of the estimation in which they are held by the public. In a journal of recent date, there was an article dealing with the history of dentistry during the last fifty years. These two sentences are taken from that article: "We had no Dental Laws but Dental Ethics were patterned after the Ethics of the Medical Profession and we believe were more strictly conformed to in general than at the present era. We had not the advertising dentist whose attractive card of self-praise, and scab work prices and misleading promises appear in the Sunday newspapers."

Now, I know full well that the advertising dentist is only a sort of malignant growth on the professional body but unfortunately it is often so much in evidence that it is the only part that a large portion of the public sees.

In a recent encounter with a decent advertising agency, I was surprised to learn that reputable business men could see no reason why dentists should not advertise just as any patent medicine vendor or a departmental store manager advertises his wares, in the most seductive manner possible. In a splendid address given at one of the Sectional meetings in Pittsburgh last year, this striking sentence was used, "The curse of dentistry has been the dollar Amalgam filling." In the same address, this significant question was asked, "What percentage of dentists do good work?" The essayist's reply was, "I do not believe twenty per cent. do—one in five."

What is the significance of these statements coming from one of our most thoughtful and conscientious teachers? Is it not this that many of our graduates leave our schools, lacking absolutely any conception of the fact that dentistry is in any way associated with preventable disease, lacking a vision of dentistry as an important factor in the physical, mental and moral welfare and happiness of the community? Let me quote one paragraph farther, from that address of last year:

"We have made wonderful progress in the last twenty-five years but what is the trouble with this distressing four out of five which has been mentioned? They left college with high ideals, certainly the great majority of them. Why did they fall by the wayside? We taught them how to do the work of dentistry as we know it each year but we did not teach them how to defend themselves and

how to grow, hence the public in general receives poor dentistry and dentistry in general is rated low socially, intellectually and financially."

The picture presented is not a cheerful one and while all may not be ready to endure these statements in their entirety, all must admit that there is much cause for deep reflection. A great responsibility rests upon the men who year after year come together as members of this Institute. Upon you and the schools which you represent must devolve the task of giving to dentistry the place which it should occupy.

An attempt is being made now, to classify all schools as first rate, second rate, third rate, etc. But it must be borne in mind always, that in any such classification there is an element, a force, an asset, that cannot be weighed nor measured, nor tabulated nor appraised. The influence of the teacher, the educational and cultural atmosphere created, the moral standards established, these are the things of greater worth than the financial value of the equipment or the architectural beauty of the building in which the teaching is done.

In a book by Sir William Osler, (which I should advise every man to read,) entitled "Counsels and Ideals," this paragraph occurs:

"The great possession of any University is its great names. It is not the 'pride, the pomp and circumstance' of an institution which bring honor, nor its wealth, nor the number of its schools; nor its students who throng its halls, but the men who have trodden in its service, the thorny road thru toil, even thru hate, to the serene abode of Fame, climbing "like the stars to their appointed height."

In conclusion, let me pay a debt which I owe to the members of this body. Sixteen or seventeen years ago, you were kind enough to receive me "one of the least of all the disciples." The things which I have learned from you form the greatest part of my poor fund of knowledge, my association with you in our annual gatherings has been among the happiest experiences of my life, the friendships which I have formed have made me rich, in the things that abide: and for all these, a debt which I can never repay.

Discussion.

Herbert L. Wheeler, New York.

The excellency of this paper is such that a discussion of it must be merely an endorsement of the many points brought out by our President. I am so in accord with the views expressed therein that I can but amplify and dwell upon the details of what has already been said.

The statement concerning the reading of an hour's essay every time the teacher enters the class-room, is, I think, extremely easy to prove. Observation has shown me that what is said about the typewritten copies of this kind of lecture is accurate and correct. I might say that this situation oftimes leads to still a worse evil, which is that the professor is persuaded to make copies of these lectures himself and sell them to the students at considerable profit, so that in many cases the student is deterred from buying the textbooks which he so sadly needs. I speak from knowledge and not as a theory when I say that that is a crying evil in some institutions.

As to the use of the quiz, if the quizmaster has a thoro knowledge of his subject (I use an *if* there) in teaching, there may be a difference of opinion as to its value. One thing is certain: Utilized regularly and with discretion it certainly helps a student to memorize the subject, and after all the effect we desire to produce upon the learner is that of enabling him to remember the subject sufficiently in detail to permit of his having it at hand when the necessity for its practical use develops.

I endorse fully the advice to read everything obtainable upon the subject one desires to teach. It would seem, however, that ability to teach well requires considerably more than this. One may read *ad libitum* or more and yet fail to acquire the necessary qualities of a teacher. To teach well, lucidly and understandingly, it is imperative that one have a thoro and well-grounded knowledge of the subject. A thoro knowledge of dental subjects cannot be secured by reading alone. Reading must be supplemented by actual observation and experience. One cause of weakness in both medical and dental teaching today is that so many teachers are made of men who lack practical experience, either because of their youth or lack of opportunity.

As a general proposition the statement regarding the use of the lantern and the teaching in darkness is correct At times, however, this method has very great advantages, and its reasonable use should not be entirely eliminated. I think with the author that one's ability to teach is quite as much to be measured by the personality of the individual, if the necessary knowledge of the facts is there, as by the careful reading of a lecture or an essay. It should not be forgotten that teaching is not entirely by word of mouth. The learner ofttimes gets as much by observing the actions, habits and mode of speech, as from one's use of language. Hence a good teacher will consider all the little proprieties in manners and methods of speech and also preserve a correct moral attitude.

As to the teaching of ethics, that is extremely necessary, but it is more desirable that the teacher live the ethics if he expects the student to profit along this line.

Aside from the teaching of sound economic principles, I do not think the question of dental fees enters into the teaching of dentistry.

It is true that an institution's reputation and standing is much more dependent upon the quality and ability of its teachers than upon its wealth and equipment. Fortunately, endowments cannot change this; they can only enable an institution to obtain a better teaching force. To be a good teacher requires discrimination and judgment. I believe these can only be obtained in the highest degree by experience. It is quite as essential that a teacher refrain from presenting to immature minds the uncertain and unproved, as that they discard the obsolete and outworn. On this point is where the line may be drawn between a good teacher and a mediocre one. Probably no one reaches perfection in teaching, but a teacher who cannot measure up to at least sixty per cent good is hardly desirable as an example to the untrained minds in the class-room. A teacher, to be valuable to an institution, should bring reputation to the institution, and not the place reputation to the teacher.

Henry W. Morgan, Nashville.

Some ten days ago I had the courtesy of a copy of the address that you have listened to this morning and have read it over several times. It is impossible in the short time allotted for discussion to do more than to here and there endorse the speaker and perhaps to indulge in an occasional dissent from what he has said. The address that I read was as little like the one that you have heard, as Dr. Thornton today is like the man I met thirty years ago; why this is true will develop as I proceed.

We have heard with great pleasure the valuable address by President Thornton, made so by the fact that his rich experience in the school-room gives greater weight to the things he has said. Who has a better right to define what a teacher is than one who loves the work as he does?—one whose voice, accent

and pleasing personality carries conviction and impresses those who hear him with the fact that back of a most alert brain and well stored mind is a great, sincere, loving heart. No one can ever make a teacher who is not in the tenderest sympathy with those he would instruct, no matter how much knowledge he may possess. Great minds with great gifts of oratory are preeminently great entertainers, but not often great teachers. They attract attention, but distract the mind, and make no permanent, last ing impression. All the truly great professional teachers of my acquaintance have been those who were in love with their work, masters of every phase of the subject, and able to communicate a knowledge of it in the simplest and most direct language, leaving the impression that there is much more to be known about it which their hearers are to get when they are better prepared to comprehend it. The interested teacher is constantly pointing out where such advanced knowledge may be secured, giving reference to magazine articles and the names of authors whose works are of particular value and which can be read with confidence, and stating that those will be helpful in attaining a better knowledge of the subject.

I agree with the essayist that no teacher should go unprepared to the class-room, but his work should be thoroly digested and orderly arranged if he would hold the attention of his class. If his work is not orderly arranged, the data properly prepared and his subject presented in a logical sequence, his would-be pupils lose interest and fail to grasp the subject or to differentiate between those things which are trivial and those which are of most importance and upon which he lays the greatest stress. The appellation that we once so frequently heard, "schoolmaster,"—signifying that the teacher was master of his subject, that he directed his pupils in thought, conduct and into studious habits, inspiring their ambition,—is just as essental in professional schools as it was of yore in the old western country school house.

The suggestion, that the student should be encouraged to repeatedly reproduce his thought in writing, is good, for many an error is discovered once he attempts to put his concept on paper.

The teacher is often mistaken in presuming upon the general information of his class, and falls into the error of "shooting over the heads" or the understanding of his pupils.

I agree with all the essayist says as to the use of the lantern and the reflectorscope. Both are valuable, but are subject to the objections urged against them by Dr. Thornton, and are often very greatly abused. In this connection the blackboard should not be forgotten, as a few lines often send home a thought when a half-hour of words would leave only a hazy impression. Models, charts and broad daylight are admirable substitutes for the lantern.

I most heartily agree with the essayist in all he has said about the teacher using a text-book in the class-room. Such use of the text-book is an evidence of ignorance as well as a reflection upon the intelligence of the class. And certainly if there are essential points that may be elaborated, the language of the teacher who looks directly into the eyes of his pupils is far more satisfactory and inspiring. A teacher speaking from his own experience does indeed then rise to the dignity of the profession and become "a fountain of knowledge."

Is dentistry a specialty of medicine? Should a man, before being given a license to practice dentistry, be compelled to possess a medical degree? Should a course in medicine be so arranged that a man would be able to obtain a degree in medicine and dentistry in five years, and should this standard be adopted by

all our dental schools? asks the President in this address. We are reminded that "these questions are continually coming to the surface," and he believes that "this Institution must be the final court of appeal in settling them." If I may be permitted a few words as expressing the opinion of one of your members, my answer to one and all of them would be "No." Medicine and dentistry are both branches of the *Healing Art;* they are inter-related because they are resting upon the same scientific foundations and have for their work the amelioration of suffering humanity. Dentistry is a branch or specialty of surgery, to which it is even more closely related than to medicine. Surgery is always a branch of the Healing Art, but not specifically of medicine. Usage has given to the word medicine a broader significance than it deserves. The sciences upon which both dentistry and medicine are founded are the property of neither. Give your dental student the same broad knowledge in the sciences that the medical graduate gets, with the dental trend, which he would not obtain if the study of these sciences was pursued in a medical institution, and he is the equal of the man who holds the medical degree. And then all these questions are answered for once and for all. Will the dental schools do it?

Truman W. Brophy, Chicago.

I am very glad of the opportunity to say a few words on the subject of the President's address. It is just such an address as I would expect from the President.

The remarks made by Dr. Morgan are endorsed by me. I believe in the use of models, I believe in the use, with restrictions, of lantern slides; not as a means of presenting the subject, but as a means of fixing the subject on the mind of the student after it has been duly presented in the lecture-room. In my own department the treatment of the subject of tumors has been made much clearer by the use of lantern slides, and also, in a recent most beautiful presentation of the subject in Rochester, N. Y., by Dr. Bloodgood, of Johns Hopkins University, pictures illustrating the conditions which precede tumors were shown which brought out and served to fix in the minds of those who had the opportunity of seeing them something of the technicality of the development of tumors and the approved methods of procedure in their removal, to an extent which never could have been secured if simply an oral discussion of the subject had been given.

I have just one word more to say. Is dentistry a specialty of medicine? We have, to my knowledge, discussed that question for thirty years, and it is doubtful if we have reached any definite conclusion on the matter. But I do know this: One of the greatest advances that has been made in the history of medical education has come quite recently thru the influence of Drs. Pickart and Rishworth, of New Zealand. Here we have been claiming to be specialists in medicine, and some men have advocated the full medical course before graduation in dentistry, but such a course will never be generally adopted. What have these men done? New Zealand is a colony of Great Britain from which has come so much of value in medical education, in fact the profession there has in certain branches set the pace for medical education almost thruout the entire world. Thru the influence of the men whose names I have mentioned, there has been passed a law making it obligatory upon every medical student before he shall take the degree of M. D., to take on an average not less than six months in dental histology, dental anatomy, dental physiology, dental therapeutics, dental pathology, and oral surgery; and after passing that examination they may take

the degree of M. D. and not until then. To slightly change the language of Dr. Chas. Mayo, of Rochester, Minn., I would say that now the dentist is bringing out more clearly to the medical profession dental pathology which is so important in order that disease may be more intelligently treated, the next great move in medical education in this and other countries will be to emulate the example set by the people of New Zealand.

I. N. Broomell, Philadelphia.

I want to say a word in favor of the use of the lantern in teaching. I have been using the lantern for a number of years for this purpose, and I think it has its place. Its place, however, is after the instructions have been given, to impress upon the mind of the student the subject by showing the illustrations. With the use of the modern lantern there is no reason why the room should be dark, because with the electric light you have plenty of illumination on the screen with some lights in the lecture-room. My idea has always been to compare the use of the lantern with the use of the microscope in the histological laboratory. If the student in Histology does not use a microscope he will never understand the subject which has been impressed upon him by reading and by lectures, but when he sees the specimen on the slide thru the microscope he then has the thing forcibly and indelibly impressed upon his mind. So I think the lantern has its place as a means of impressing finally on the mind of the student what you have told him before its use.

George H. Wright, Boston.

I am a new comer in your midst. I would like to bring a word to this body as a note in the method of teaching which I have been engaged in for the past fourteen years in connection with the Harvard University Dental School. Some fourteen years ago I was appointed on the medical teaching staff of the Harvard Medical School, in order to give instruction to the third and fourth year medical men in subjects related to dentistry and the diseases of the nose and throat, in connection with diseases found in the mouth. It was necessary to presuppose that these men had had no special instruction in dental anatomy, dental histology, or dental embryology. Therefore I gave them a review of the anatomy of those special parts. I had taken my course of study as a dental student with the medical men in the early days, and I knew how little they had been given in that particular department. Upon that basis I was able to build something that was tangible and constructive. We passed from our study of anatomy and histology to the broader aspects of the diseases of the mouth, and then were able to review the pathologies with which we are more or less familiar. Then, having given a course of lectures to the medical students in the third year, finally in their fourth year, when almost ready to be graduated, I began to show them the practical relations, the various applications, and the approved methods, of diagnosis and treatment and the correlated elements which a physician should appreciate in his relation with dentists. In order to complete this instruction, I would take these men in groups to the Massachusetts General Hospital, where I am on the staff in the Department of Rhinology and Laryngology, and there show the students in the clinic not one case, but twenty-five cases in a morning comprising diseases of the antrum, enlarged glands, infected tonsils, deviated septa, involvements of the sinuses, malformations, cases of neuralgias quite obscure, and our methods of approaching the problem for its ultimate solution, requiring that these medical men take notes. They became so interested that they asked questions, and

fell back upon the foundation which I had already laid for an understanding in dealing with those cases, any and every one of which might at some time enter their offices with the particular problem involved.

Having made the diagnosis, the next step was the question of treatment. These men would come later and see what we would do in the way of treatment. Occasionally a patient would be referred to the neurological clinic or to the general medical clinic for further examination or for X-raying, as the case might demand.

The next step was a study of an operation in oral surgery. The men would see the operation, learn the why and wherefore for it, have an opportunity to study the technic, and then, as the next step, would see the patient perhaps after one week's treatment, and finally the completed case, if it happened to be something outside the ordinary routine case.

In this way we are able to correlate cause and effect. The students are able to get our definite point of view, which is of great value to these men, and they have said to me frequently: "This is the first case in the whole medical course in which we have been able to follow the problem from the beginning to the end and see the results that have been obtained." Of course, I could only touch in superficial manner on the questions of Orthodontia, but these men invariably go back to the dental school clinic at some later time to see what is done with particular cases of deformity, and have opportunity to see before the end of the year what beautiful work is being done in regulating. Furthermore they are able to realize that probably sixty-five per cent of the antrial cases are associated with diseased teeth, and that no amount of operating on the antrum from a laryngological point of view is sufficient to clean up the disease without the concomitant cooperation of the dentist. This interrelated study with medical students who learn the dental viewpoint, has proved immense value as these men after graduating soon learn to cooperate with their local dentists in their attempts to solve many problems.

Dr. Thornton: You know how the very nature of a micro-organism changes if you change the medium of development. My medium of development was changed six years ago, when I was, (happily for the patients), lifted out of the sphere of general practice, since which event I have been devoting my time to hospital work.

As I have seen the close relationship existing between mouth conditions and the general health of the body in various pathological conditions, I have come to realize this fact: That in future there must be a closer cooperation and appreciation between the men who practice dentistry and the men who practice medicine. Neither can get along without the other, and we must rise to the situation.

THE CLASSIFIED INDEX OF DENTAL LITERATURE AND ITS USE IN OUR SCHOOLS.

By Arthur D. Black, A.M., M.D., D.D.S., Chicago.

(Read before the American Institute of Dental Teachers at Atlanta, Georgia.)

IN CONNECTION with the report on the indexing of our book and journal literature, it seems opportune to discuss the relation of our periodical literature to the profession's progress. This should help us to recognize some of the handicaps under which we have labored. The development of our journal literature is closely related to our teaching, to the quality of our text books, to the work of our societies and to the general advancement resulting from individual effort.

Our better journals have done much to promote the progress of dentistry; many poor ones have doubtless retarded it. A few are continually leading the way toward higher ideals and better service; the majority simply reflect the progress which is being made. We have but few journals in which the editors stand out boldly as leaders who are concerned that their readers shall be guided along safe paths. With too many there is little evidence that an editor exists; some issues do not print a single original article; in others the object apparently is to have just enough pages of reading matter in proportion to advertisements to comply with postal regulations.

We should encourage more of seriousness in the development of our literature and greater respect for those who have written well in the past. Nothing can be more inspiring to the young man than the perusal of the writings of those who have contributed prominently to the profession's progress, thus cultivating acquaintance, if not actual companionship. It is not only to be desired that dentists shall read more; it is quite as important that the material offered shall be improved, and that our future graduates shall be taught to discriminate and use better judgment in their consideration of the journal literature.

Our periodical literature began with the publication of the first number of the American Journal of Dental Science in 1839; that was eighty years ago. Since then there has accumulated, gradually at first, more rapidly in recent years, a collection which would overtax a single individual to review, and which in bulk of books makes a library of good size. Knowing what we do of the men who have preceded us, and inspired by the desire to give them full credit for their labors; to use their writings as foundations for the future; to introduce them to the oncoming men of our profession; to arrange in an orderly way the things in our literary house, we have undertaken the large task of indexing and classifying this mass of material. This we have done with the hope that it will gradually bring improvement in our journal literature; that this literature will be more definitely reflected and more promptly crystallized into books. We believe the index will enable us to so train our students that they will have a better appreciation of the value of periodical literature; that they will read it more critically, and prepare their own contributions only after thoro study and painstaking effort.

Indexing and Classifying.

In 1886, Dr. Johnathan Taft published an Index of Periodical Literature of Dental Science and Art as presented

in the English Language. This appears to have covered all publications in English from 1839 to 1885, inclusive. It is a book of 212 pages, of which 116 are devoted to a subject index, and 84 to an author index. In the preface the author states that it was not the intention to catalog every paper, but to furnish references to the principal ones. There are in this about 10,000 subject references, and it is a very creditable work. I have often wondered how many dentists of today know that such an index was published.

Dr. Port, of Heidelberg, prepared a classified index of the articles in the German Dental Journals for the years 1903 to 1907, inclusive. This consists of about 180 pages per year, of which about 140 are devoted to the subject index, and about 40 to an author index.

So far as I know these are the only published indices, except two which the writer prepared, one covering the proceedings of the First District Dental Society of the State of New York, in 1909, the other the transactions for the first fifty years of the Illinois State Dental Society, published in 1914.

In presenting our report of progress in this work, I have thought you might get a better understanding of the magnitude of the task by a little object lesson. I have therefore brought for exhibit all of the journals for the five year period—1911 to 1915 inclusive—the articles in which have been indexed and classified for our first published volume. I have also brought the cards and some of the typewritten sheets, and wish to explain briefly how this work has been done. There are in this group sixty periodicals published during the five years period; some of them for only part of it. A list of these is appended. It will be noted that it includes the journals published in England, Canada, Australia and New Zealand, in addition to those of the United States. As nearly as I can estimate, these represent about one-sixth of all of our periodical dental literature in English, which extends back to 1839. I am under obligation to Dr. William Bebb for valuable assistance in collecting many of the rare publications; also to Dr. L. P. Anthony and others for loaning or giving numbers to which I did not have access.

For completeness, many journals have been included which are of little value. Most of the bulletins issued by state societies, as well as the majority of college publications, are of no more than passing interest, and several of the so-called dental journals I would consider worse than nothing; yet in view of the possibilities of future development, all have been indexed.

The plan of carrying on this work has been previously presented before this body. I wish to refer briefly to certain important details. I must not neglect, however, to mention that the scheme is that of the Dewey Decimal Classification and Index which has been worked out for dental literature. We have gradually made up a list of subjects covering the entire field of dentistry, and it is our object to place each article appearing in the literature under its proper subject heading. The list of subjects is so arranged that related headings are grouped. For example, under Operative Dentistry we have sub-headings for the several kinds of fillings and inlays, pulp treatment, etc. Each of these headings, of which there are about 150 at the present time for the field of dentistry, has a number, which is used in our work of indexing and classifying. The task of preparing the index consists of ten principal steps, as follows:

First: Review the aricles in each journal and mark opposite the heading, the number indicating the subject under which the article should be classified, together with number of pages, number of illustrations, etc. Oftentimes an article must be classified under two or three headings, in which case the addi-

tional numbers are entered. This is the most difficult and at the same time the most important features of the work; all else is largely mechanical, altho exacting. I wish to emphasize the fact that we are preparing a classified index, which means that the titles of all articles on a given subject will be found together. This requires that the indexer must know what the article is about; must read part or all of it if necessary. This classified index is not therefore a simple rearrangement of the indices of the several journals, but represents a critical study of each article to determine its contents. For very valuable service in this connection I wish to mention the fact that the bulk of the present work has been performed by Mrs. Josephine Koch Crain, daughter of our late lamented Dr. Charles R. E. Koch, and if she did not possess many of the virtues of her father, I'm sure she would not have stuck by the ship on this task, for it is one to try the patience of Job himself.

Second: Two cards are written for each article, one called the subject card, which has the classification number in the upper left corner; the other called the author card, with the author's name at the top. An author card is also written for each discusser of a paper.

Third: The subject cards for each journal are arranged according to their classification numbers, thus bringing all the cards for each subject together. In doing this the cards for each subject are kept in proper chronological order.

Fourth: The subject cards, as rearranged, are copied on sheets, a carbon copy beind made. This gives a complete classified index for each separate journal for the five year period.

Fifth: When the sheets are typewritten for all the journals, they are cut apart, all of the articles for each subject being on a separate slip. These slips are then rearranged so that all of the articles on each subject in all of the journals are brought together. This list is the copy for the printer for the subject index.

Sixth: The carbon copy of the subject cards, which has not been cut and rearranged, is used to check back with the journals for errors. This requires two persons and is a tedious and painstaking task. As the carbon copy is an exact duplicate of the rearranged original, this single checking insures the correctness of the printer's copy.

Seventh: Review the list of articles classified under each subject and prepare an alphabetical index to the classified lists. This is done in order that one entirely unfamiliar with the scheme of classification may readily find the articles on any desired subject, the alphabetical index giving the page reference.

Eighth: The personal cards are arranged alphabetically, thus bringing together for each individual a list of papers, discussions, clinics or other matters of noteworthy record.

Ninth: The author cards are copied on sheets. These are the copy for the printer for the personal index.

Tenth: Read the printer's proof. This requires two persons experienced in this particular work.

I have brought as a part of this exhibit the cards which have been written for the five year volume, 1911-1915. There are about 18,000 subject cards, and about 23,000 author cards; a total of 41,000. This index will make a book of about 800 pages, which is 200 pages more than we estimated last year. The additional number of entries is due in part to the decision to index additional journals, and in part to error in the previous figures. However, I think the printing will not cost a great deal more than was estimated last year for the 600 page volume.

We had made our plans to have printed volumes for distribution at this time, but that has been impossible, due principally to the fact that Mrs. Crain

felt it her duty to go into social service work for a part of the year, and your essayist devoted two months to Government service. Everything considered, we have made better progress than should have been expected. It will require about four weeks to complete our copy for the printer, and we hope to be able to distribute the bound volumes some time before the close of the school year.

In addition to the above, most of the better journals for 1916 and 1917 have been indexed and the cards are written for those of 1916. I see no reason why we should not be able to get out during the present year a three year volume for 1916, 1917 and 1918, which will give an index for eight years in ample time to mature our plans for the first senior class of the four year course.

Many perplexing problems have arisen, among these being the determination as to whether or not certain articles or groups of articles in a given journal, should be indexed or omitted; which of the articles abstracted or copied in toto from other journals should be indexed, which of those copied from medical journals, and from lay magazines and newspapers; what should be done with toasts at banquets, with original communications which appear to be simon pure advertising matter; with articles on how to bunco the public into paying large fees, with presidents' addresses, with correspondence from the South Sea Islands, with obituary notices, etc., etc. In the main, if we have erred, it has been by including all those articles about which there was question as to the desirability of indexing them, as I thought this the safest rule to follow.

The Use of the Index.

It is important that we should consider the use which may be made of the index in the study of the periodical literature in our schools. To do this we must first fix in our minds the practical relationship of this literature to our text books. This relationship is well stated in an article on the literature of Plastic and Oral Surgery in the January, 1919, issue of The Journal of the National Dental Association.* It is there pointed out that valuable ideas and procedures are on the average possibly five years old when they appear in books. The process is about as follows: An investigation is carried on over a period of months or years until certain facts are established. These are presented in the form of a paper or clinic before a society, and in due time published in a journal. The author may as a result be invited to appear before other societies, and additional articles are published. Other men take up the same line of study; they may develop new methods; there is discussion, and as a result of criticism, debate and further study, the original methods are modified and they are gradually fitted into their proper niche in relation to other things—they are crystallized into a book which is likely to survive if the work has been well done and has a practical application. In many instances, the new idea gradually disappears, because it is freakish or too radical, not giving proper consideration to related subjects.

On the average, the journal article does not present the mature thought, nor is it likely to have sufficient regard for the well fixed basic principles of practice, as will be found in the book. For this reason our teaching should be in the main from carefully selected text books. It is most important that the student be well grounded in the underlying principles while in college. After the foundation is laid, we should train our students in the study of the current literature in relation to basic principles; teach them to apply to the new ideas the search-lights of biology, chemistry and physics, and to oftentimes recognize the false premise upon which an entire argument may be based; to eventually become

*Military Plastic and Oral Surgery, by C. E. Black.

acquainted thru their writings with those men who are safe to follow, and those who are unreliable.

In the opinion of your essayist, the most important difficulty in the way of improvement in our periodical literature, at the present time, is the lack of knowledge on the part of both contributors and readers of the fundamental subjects upon which our specialty is based. There is a lack of depth in the writing and a lack of power of discrimination in the reading. It therefore is most urgent that we strengthen our basic courses.

The book should, as a rule, present in concise form the development of thought along the line of discussion. It should not only crystallize the new ideas of recent years, but should also summarize the previously developed facts upon which present knowledge is based. Because our journal literature has been so inaccessible thru the lack of an idex, it is believed that the majority of our books do not report sufficiently the valuable work of many contributors to the periodical literature. This condition will doubtless be improved as the result of the publication of the index.

It would seem, therefore, that there are two reasons for supplementing our regular text book teaching by the study of the periodical literature: First, to open to the student the principal avenue by which he may keep abreast of the times in practice, and also teach him to analyze what he reads and separate the wheat from the chaff. Second, to instil in him the desire to know thru their writings those men who have blazed the trail; to bring him to recognize his obligation to them, and to teach him something of the rules of survival. Surely one who reads the journal literature of a subject over a period of years, cannot fail to realize that in the test of practical experience much evaporates and very little crystallizes.

That those who are contributing to our journals today need such training is evidenced by the very meagre number of bibliographical references which appear. Even without an index of the literature, the paucity of such references is inexcusable. With a proper index, our societies and our editors should question seriously the right to publication of articles which do not carry evidence of familiarity with the literature of the subject.

In developing a plan for the systematic use of the index in colleges, it is essential that we place this work in the best relation to other courses. For this purpose, we might divide the education of the dentist up to the time of graduation, under five headings: preliminary education; the basic studies in college; the more strictly dental subjects; the application of this knowledge in clinical practice; and preparation to continue his own education in the future. The study of the literature would naturally fall into the last group and become a part of the senior course. If placed earlier in the course, the diversity of thought and method presented in the various articles would tend to detract from the teaching of the foundation principles of practice. In the senior year a properly arranged course should serve to forge a strong connecting link between the college education and the after progress and practice. We should endeavor to bridge over between our teaching along fixed and somewhat limited lines, and the very wide range of ideas and practice into which the new graduate is launched. It will be much better for him if we can give him a broader view and at the same time train him to keep reasonably close to the middle of the road. It is not, therefore, so much for the purpose of teaching the new or later ideas which may appear in the recent literature, as to bring the student to an appreciation of the nature of the literature and to cultivate his power of discernment and judgment in reading. He should be brought to realize that he must keep in close con-

tact with the current literature for new ideas, but that it is necessary to weigh each article and select the limited number which are of practical value. The standard texts should be continued as his foundation, which must be constantly strengthened with new books. He should use the books to test out the new ideas of the journals.

In order to fix more definitely in your minds the idea of the seminar course as discussed a year ago, I wish to present a plan for a group of twenty-four senior students. This may apply to a class of twenty-four, or to a larger class divided into several sections of twenty-four each. This plan may be modified for slightly larger or smaller groups, but thirty is probably about the maximum number for a group.

Suppose we set aside four hours each week for essays and discussions for the group of twenty-four, one hour under the supervision of the head of the department of operative dentistry, one hour for prosthesis, one hour for dental pathology and one hour for oral surgery. From our thirty-two weeks of school we will deduct eight for examinations, special lectures for this course, extensions of time for exceptionally interesting subjects, etc., leaving twenty-four weeks for the seminar course as laid out in advance. The first week of the school year is devoted largely to organization; the second week, so far as this course is concerned, should be used for presentation of the general plan; the third to a discussion by each of the four department heads of the work in his subject. Beginning with the fourth week of school, the first essays by students should be presented, the assignments having been given out during the second week.

For each seminar hour it is suggested that four or five articles be assigned to three students not less than two weeks in advance. One will be the essayist, the other two the discussers. The essayist will be expected to present a twenty minute paper on the article assigned, and the discussers will each have ten minutes. This will leave about fifteen minutes for the department head to review the presentations and criticize the articles reviewed. A few minutes might be devoted to impromptu discussions by other members of the class. For the four subjects this plan will give twelve men assignments each week. Each student of the twenty-four would therefore be on the program as essayist or discusser every second week, his term as essayist coming every sixth week.

There are many possibilities in such a plan. It will undoubtedly be very beneficial if the instructor in English can give each essayist a hearing for criticism, in advance of his appearance before the class. The hour might occasionally be conducted as a society meeting, with strict adherence to rules of order, students occupying the positions of the officers.

The lists of articles should be selected in advance and with the greatest care, for success will depend largely upon the interest which these create. For each subject there should be considerable variation. One group of articles may be historical, another may all be by one author, another on oddities or freaks, another may consist of papers in direct opposition, etc. The entire program for the year should be prepared in advance. It should include an occasional assignment of a subject only, requiring the student to select the articles which are to be reviewed. This will require the student to use the index himself, select his list of articles and then prepare his essay. As a rule the essays and discussions should be limited to a specific thing, and not deal with generalities. In the assignment of a group of articles, it may be directed that only one phase is to be discussed. For example, in a group of articles on artificial dentures, the essay might be limited to impressions, or to the technic of setting up the teeth.

Those who are appointed as discussers need not be limited to the artcles assigned to the essayist, but should be encouraged to look for other writings on the same subject. There is almost no limit to the interesting variations which may be introduced.

It should be apparent that this work cannot be carried on successfully without careful study and preparation by those in charge of the courses. They should be familiar with all that is published on their respective subjects, yet ths work will require more critical reading of artic-les than has been customary by most of us. In fact those who supervise these courses should form the habit of making a brief abstract of each article, using cards for the purpose. In this way each teacher would gradually accumulate a very valuable card file of outlines of the literature of his subject.

These courses should preferably be personally conducted by heads of departments, not by assistants. This might limit the schedule which may be arranged for the larger schools, as it would require for each subject a separate class hour for each group of twenty-four every week.

It will of course be necessary for schools to have an adequate library and a suitable reading-room. If possible several files of the better journals should be on hand, to meet the demands of a number of students working at the some time.

I can conceive of no plan which will have a more far-reaching effect for the uplift of the profession than the one here outlined. The graduates who have had such training would naturally enter actively into society work in their respective communities, and at least a fair percentage should become leaders who would instil in others a more progressive spirit. It is appreciated that important changes in our profession must be gradual, and we need not look for a sudden rush of dentists to the libraries. However, if we are to progress, we must improve our periodical literature and it must be read critically by a larger number. Does not this index and the plan here presented offer sufficient hope to justify a serious trial?

LIST OF DENTAL JOURNALS INDEXED FOR YEARS 1911-1915, INCLUSIVE.

Notations are entered for those journals which were not published regularly thruout the five year period.

Acorn. College of Dental and Oral Surgery of New York, New York City. Eleven numbers, Nov., 1913, to Apr., 1915.

Allied Dental Societies, Journal of New York City. Quarterly.

American Dental Journal, Batavia, Ill. Monthly.

American Dentist, Chicago. First number June, 1915. Semi-monthly.

American Medical Association Journal, Section on Stomatology, Chicago. Weekly. (Only papers read before Section on Stomatology indexed).

Articulator. Kansas City Dental College, Kansas City, Mo. Six numbers to the year. (April, 1911, last number).

Ash's Monthly, London.

Australian Journal of Dentistry, Melbourne, Aust. Monthly.

Brief, Dental, Philadelphia. Monthly. (Dec., 1913, last number).

British Dental Journal. London, Eng. Semi-monthly.

British Journal of Dental Science, London, Eng. Semi-monthly.

Bur, Chicago College of Dental Surgery, Chicago. Bi-monthly. Quarterly.

Colorado State Dental Assn., Bulletin. Vol. 1, No. 1, Sept., 1915. Irreg.

Commonwealth Dental Review. Sydney, Aust. Monthly.

Cosmos, Dental, Philadelphia. Monthly.

D. D. S., Dayton, Ohio. Bi-Monthly. (Vol. VI., No. 2, Mar.-Apr., 1911, last number).

Digest, Dental, New York City. Monthly.

Dispensary Record, Dental. Rochester, N. Y. Bi-monthly. (Jan., 1910, to Nov., 1913).

Dominion Dental Journal, Toronto, Ont. Monthly.

Edinburg Dental Student, Edinburg, Scotland, Bi-monthly.

Forum, Dental. Univ. of Buffalo, Dental Dept. Buffalo, N. Y. Irregular. (No copies published during 1911.)

Garretsonian, Philadelphia Dental College, Philadelphia. Irregular.

Illinois State Dental Society Bulletin. Monthly except June, July, August.

Indiana State Dental Assn., Bulletin. Quarterly. (Sept., 1913, first number.

Institute of Dental Pedagogics, 1911, 1912, 1913.

Institute of Dental Teachers,, American, 1914, 1915. Annual.

Iowa State Dental Society Bulletin, Vol. 1, No. 1, No. 1, Jan., 1915, 7 number to Dec., 1917.

Items of Interest, New York City. Monthly.

Kentucky State Dental Assn., Bulletin. First number Nov., 1913. Monthly except July and August, 1914; except July, Aug., 1915; bi-monthly beginning Sept., 1915.

Lincoln Dental News, Lincoln Dental College, Lincoln, Neb. Quarterly. (Vol. 1, No. 1, Sept., 1914.)

Michigan Dental Journal, Detroit, Mich. Monthly. (First number, Oct., 1915.)

National Dental Association, Bulletin, 1913, 1914, Journal, 1915, Huntington, Ind. Bulletin, quarterly. Journal, monthly.

Nebraska Dental Journal. Monthly. (First number, July, 1913.)

New Jersey Dental Journal. Monthly. (First number, Jan., 1912.)

New Zealand Dental Journal. Dunedin, N. Z. Monthly.

Northwest Journal of Dentistry, Portland, Oregon. Monthly. (First number, March, 1913.)

Northwestern Dental Journal, Northwestern University Dental School, Chicago. Quarterly.

Odontologist. New York College of Dental Surgery. New York City. Eight numbers to the year. (June, 1911, last number.)

Oklahoma State Dental Assn. Bulletin. Vol. 1, June, 1911, Dec., 1911, March, 1912; quarterly beginning June, 1912.

Oral Health, Toronto, Ont. Monthly.

Oral Hygiene. Monthly.

Orthodontia, International Journal of St. Louis, Mo. Monthly. (First number Jan., 1915.)

Outlook, Dental, New York City. Monthly. (Vol. 1, Mar. to Dec., 1914.)

Pacific Dental Gazette, San Francisco, Cal. Monthly.

Penn. Dental Journal, Dental Dept. of University of Pennsylvania, Philadelphia. Quarterly.

Pennsylvania State Dental Society Bulletin. Vol. 1, No. 1 March, 1914, No. 2 June, No. 3 Jan., 1915 No. 4 Mar., 1915, Vol. 2, No. 1, June 1915, No. 2 Sept., 1915, No. 3 Jan., 1916.

Plugger. Louisville College of Dental Surgery. Louisville, Ky. Irregular.

Practical Dental Journal, San Antonio, Tex. Monthly.

Practice, Dental, Toronto, Ont. Monthly. (Jan-, 1913, last number.)

Record, Dental, London, Eng. Monthly.

Record, Dental. New York College of Dental Surgery, New York City. Two numbers issued in 1915-16.

Record, Dentists, Des Moines, Ia. Monthly. (Dec., 1914, last number.)

Register, Dental, Ann Arbor, Mich. Monthly.

Reserve Dental Topics, Western Reserve Univ. Dental School, Cleveland, Ohio. Vol. 1, 5 numbers, Jan. to May, 1915; Vol. 2, No. 1, 2, Nov. and Dec., 1915.

Review, Dental, Chicago. Monthly.

Scrap Book, Dental, Newark, N. J. Monthly. (Sept., 1913, last issue.)

Spectator, College of Dental and Oral Surgery of New York. Four numbers from Feb. to June, 1915.

Summary, Dental, Toledo, Ohio. Monthly.

Surgeon, Dental. London, Eng. Weekly.

Texas Dental Journal, Dallas, Tex. Monthly.

Western Dental Journal, Kansas City, Mo. Monthly.

The following issues of journals have not been indexed because it has been impossible to secure copies:

Acorn, College of Dental and Oral Surgery of New York. Vol. 1, No. 3, 6; Vol. 2, No. 1, 2, 4.

Edinburg Dental Student, 1910-1911, No. 4; 1912-13, No. 1, 2.

Lincoln Dental News, Lincoln Dental College, Vol. 1, No. 1, 2, 3.

Plugger, Louisville Dental College, Vol. 3, 1911. all; Vol. 5, No. 1, 2; Vol. 6, all; Vol. 7, all except No. 1.

Practical Dental Journal, San Antonio, Tex., 1911, all; 1912, except Nov.; 1913, except Oct.; 1914, Jan.

Record, Dental, New York College of Dental Surgery. First number issued in 1915.

Discussion.

Guy S. Millberry, San Francisco.

It seems to me that the financial aspect of this problem is more important than any informal discussion of the subject itself. I would therefore suggest that we take up the matter of finance and discuss it at this time so that the good work Dr. Black has presented today may be perpetuated.

In presenting this phase of the discussion, I am somewhat familiar with the financial side of this problem. Dr. Black, with his systematic and thoro manner of doing things, has shown us conclusively that by taking a small amount of cash left over from the former Dental Index Bureau, and adding to this the work and personality of Mrs. Crain, he has been able to accomplish for the profession something never accomplished before. Some time ago I spent quite a little time at the Army and Navy Museum in Washington interviewing Dr. Fielding H. Garrison, editor of the Index Medicus, who had a graduate dentist assisting him in indexing several of the dental journals for the benefit of

the Army and Navy Dental Officers. The question arose as to whether it would be possible for them to index all dental literature for the dental profession, or not, and it proved at that time impracticable to do so for two reasons; the amount of work involved, and the question of finance. Dr. Black has shown us that much can be accomplished with very limited means. We will not be able to appreciate the full value of the work that has been presented today until we begin to make use of the dental index in our teaching work and have succeeded in stimulating the full literary activity of those men who consult us in regard to the presentation of a given subject.

I would therefore suggest that an adequate plan be advanced by this Institute, thru its membership, whereby some means of perpetuating the work that Dr. Black has presented may be provided, which will be wholly commensurate with the service which Mrs. Crain and Dr. Black have rendered to the dentists of America. The value of the Index to us as a profession and as teachers is so great that the work should not be discontinued, and if the question of finance is standing in the way this should be cleared up.

The President: I would suggest that at this time Secretary Hoffman present a resume of the condition of the finances as applied to the Dental Index Bureau.

The Secretary: The finances of the Index Bureau are in good condition as far as the present is concerned. However, it will be necessary for the schools that have been delinquent in pledging their subscriptions to come to our assistance in the near future. In arriving at the amount of the allotments for the several schools we have followed the student pro rata plan as used on several occasions recently by the Educational Council and other bodies, and in this manner we have arrived at the $3190 as the total allotment.

Early last year a subscription blank was prepared and a prospectus setting forth our plan of operation was sent along with it to every dean. Twenty-nine schools have signed and returned these subscription blanks to me representing $1565. This is just a trifle under one-half of the total amount alloted, leaving $1625 in subscriptions to come in from 17 schools—about one-third of our membership. From most of these schools I have had no acknowledgment to say nothing of the signed subscription or a remittance. Of the $1565 signed for there has been collected $1338.56 which is practically the full amount subscribed.

I have here for your inspection an exhibit of literature, subscription blanks, allotment for each school, etc., etc., and will endeavor to answer any questions in due course and at the proper time.

The financial report herewith shows that my expense in behalf of the Index has amounted to $864.75 leaving a balance of cash on hand of $473.81. The Index accounts have been kept entirely separate and distinct from the "regular" account of the Institute, and I wish to submit them now to the Executive Board for audit:

FINANCIAL REPORT.

Total allotment, 46 schools.....		$3190.00
Total subscriptions received, 29 schools	$1565.00	
Balance allotment not subscribed, 17 schools.....	1625.00	
Total receipts per cash book....	$1338.56	
Total expenditures per cash book	864.75	
Balance on hand.....		$473.81

The following schools have sent in their subscriptions:

Northwestern University, Dental School.

Vanderbilt University, School of Dentistry.

Royal College of Dental Surgeons.

Chicago College of Dental Surgery.

University of Michigan, College of Dental Surgery.

Ohio College of Dental Surgery.

University of California, College of Dentistry.

University of Iowa, College of Dentistry.

Indiana Dental College.

Ohio State University, College of Dentistry.

Washington University, Dental Department.

University of Pittsburgh, School of Dentistry.

New York College of Dentistry.

University of Illinois, College of Dentistry.

Tulane University, College of Dentistry.

University of Southern California, College of Dentistry.

Colorado College of Dental Surgery.

Tuft's College, Dental School.

Georgetown University, Dental Department.

Creighton University, College of Dentistry.

Medical College of Virginia, Dental Department.

University of Tennessee, Dental Department.

McGill University, Department of Dentistry.

Dalhousie University, Faculty of Dentistry.

Harvard University, Dental School.

George Washington University, Department of Dentistry.

North Pacific College of Dentistry.

Marquette University, Dental School.

Loyola University, School of Dentistry.

As stated before a number of the schools have not responded at all to our communications, of which there have been three or four at least to each school; some have replied and asked for further information, and the matter has stopped there. Your Secretary is perfectly willing to carry on the correspondence and endeavor to get results, but at the same time it does not seem as if it ought to be necessary to send half a dozen letters in order to receive a reply.

Dr. Millberry: All of us who have had the opportunity of hearing Dr. Black's paper, realize something of the amount of work that has been accomplished in indexing these particular journals during this brief period of time and have obtained some estimate of the value the Index will be to dental teachers in the future. I also feel that our admiration of the ability of Dr. Black to crystallize and systemize any given piece of work, that may be charged to him, is so great that it needs no further expression than that we appreciate and approve of what he has done. If any of you have given even slight attention to the work that has been accomplished during the past year, and if you are familiar with the work that was done in connection with the Dental Index Bureau during four or five years prior to that time, you perhaps realize more or less fully how much has been accomplished in carrying it forward in spite of the trying conditions under which the dental schools have labored during the past year.

In his most excellent paper, Dr. Black has stated that dentists should read more, and that the character of the material which dentists are called upon to read in their journals should be improved. In a general sense I think we all believe that dentists should read more, but the members of this Institute have been in no position to insist upon that desideratum. As teachers, however, we are in a very favorable position to demand that our students read more, and if we take advantage of that opportunity and improve the facilities which this Index offers to us, first in making us familiar with the particular phase of dental literature in which we individually are interested, and, second, as teachers in our respective schools, we improve the opportunity to insist that our students do a greater

amount of reading on certain subjects, we will I am sure come to appreciate the value of this work in that regard.

In the course of his remarks, the essayist mentioned the fact that it frequently became necessary, in indexing, to classify articles under two or three or four headings, the reason for this being that oft times the heading of a paper did not imply in and sense what the subject matter consisted of. Under these circumstances, an attempt to correlate or coordinate the subject, and the material within the text, taxes our imagination and our conception of what a title should be to the utmost. But when all dental literature, especially the journal articles, is indexed, it may have the effect of inducing authors of papers to set forth more concisely, in their topic or heading, the real substance of the article they are endeavoring to present to the profession. That of itself would be a very valuable thing. When we undertake to read an article whose title is appealing to us, and find that the ideas expressed therein have no bearing on the subject in which we are especially interested or on the information that we had hoped to obtain, we feel that much time has been wasted.

Dr. Black also raised the question as to the character of the material that should be indexed and included in that the question of presidents' addresses, obituary notices, and various items which are of the greatest importance in a general way, and in raising that question he asked our advice as to what the profession should like to have done. From a careful reading of the paper presented, it seems to me that it would be more appropriate for Dr. Black to tell us what he thinks ought to be indexed, then, either by suggestion, motion or resolution, recommend to the committee, appropriate action, to the end that the full sanction of this body shall be given to a recommendation that only original articles shall be indexed. This might have a salutary effect on those editors who are inclined to fill their journals by "cribbing" material from other journals. If a journal, for instance, had only one original article in it each month, and the Index proved that fact, it might have the effect of inducing the editor of that journal to solicit more original work, or prevent so much "cribbing" from other publications. Dr. Black states he has found that some of the printed articles have gone thru practically the entire gamut of dental journals by re-publication, and altho a man would be likely to get it from one source or another, he would naturally feel that the general expense incident to publishing dental journals, borne by him either directly thru subscription or indirectly thru the cost of the publications of the dental supply houses, which we know is borne by the dental profession, was too great for the amount of information obtained. This might have the effect, then, of reducing the costs of publishing journals, censerve the time of the reader, and improve the quality of the articles accepted for publication. The placing of editors in the dual position of being solicitors for articles and at the same time critics, as Dr. Black has suggested, might be done in order to eliminate the unfit material. They would perhaps have a great deal of difficulty in attempting to eliminate material which they considered unfit, but, on the other hand, is it not a part of their duty to save time for us, by eliminating such material as has been offered repeatedly before and no longer needs space in dental literature? We have criteria for this in the Journal of the A. M. A., and also particularly in a journal that I am perhaps better acquainted with, the Journal of the American Chemical Society. They seem to have no difficulty in eliminating unfit material and filling their columns with good material which is original in character.

Dr. Black also raised the question as to the quality of material which appears

in the dental journals, and stated that if our writers had a better knowledge of the fundamental basic sciences underlying general medicine, the articles presented would be much more valuable. And in so stating it seems to me that he has thrown his hat in the ring and straightforwardly challenged us in our educational work. Shall we accept that kind of challenge and say that the other professions offer perhaps nothing better than do the journals of our own profession, or shall we accept the challenge in another sense and endeavor to improve our material by teaching in such a way that the articles which appear in our dental literature shall be more worthy of our reading hours than they are in part at the present time?

The discussion of the use of the Index from the standpoint of thesis and seminar work appeals to me very materially, especially in its application to seminar work. In our institution in the West we have for a number of years followed the seminar system of teaching, and last year, before the Section on Prosthetic Dentistry of this Institute, Dr. Mauk presented a paper on this problem and explained in some detail how he has handled his Senior work. (Page 138, Proceedings 1918). In our department the seminar system of teaching prosthetic dentistry has entirely replaced the old system of didactic instruction with final examinations, to the entire satisfaction of both the student and the instructor or professor. The work, conducted both as a seminar, and in a sense, as a Society affair, is proving most illuminating both to the student and to the teachers. The student gets a better understanding of prosthetic dentistry and it does not throw the burden of work in that regard on them at the end of the year. The Index will be of very material benefit to us under those conditions.

If the work of indexing dental literature is to go on, as we all believe it should, then some means must be provided by this Institute to carry it on. Dr. Hoffman, who has had charge of that work, is in position to explain to you the needs of the Institute in this regard. I have had the pleasure of seeing some of the work done by Mrs. Crain, who has been assisting Dr. Black on the Index, and I am quite sure that the members of the dental profession generally, and particularly of this Institute, not being conservant with the work she has done, do not appreciate the value of her service to Dentistry, and probably none of us will fully appreciate its great value for a full decade, after it has come back to us repeatedly that—Here are the articles on a certain subject of dentistry, in classified form, available to us in the briefest possible time. Therefore I think some plan should be created at this time whereby this work may be perpetuated in commensurate terms, both as to the value of Mrs. Crain's service to the profession and the value of her service to this Institute. This is one of the important things that should be done thru our membership. The Institute as a whole being only in a position to make recommendations, each member should assume his own responsibility in carrying on the work which Dr. Black has set forth at this time.

Richard L. Simpson, Richmond.

The work in connection with the classified index of dental literature undertaken by Dr. A. D. Black, is one of the most exhaustive ever undertaken by a dentist. It calls for rare tact and judgment, and we are fortunate in that Dr. Black regards it as one of his duties. I wish he had, in his forceful manner, more strongly urged—"more seriousness in * * * * our literature and greater respect for those who have written well in the past," for we cannot demand from the public respect and confidence when we only half-heartedly accord these to our thinkers and writers. Original ideas change the whole line of our wŏrk, and credit should be given to

him who first suggests, and thus spare many petty jealousies and often great injustice. It is so easy for our more prominent men to steal the thunder of a less prominent one and do it unconsciously for lack of the classified index.

Bibliographic references add weight to an article, show that the author is familiar with the work of thinkers along the same lines, do justice to his fellow essayists, and put dentistry on a higher plane.

Dentistry can never be one of the exact sciences, but it can be at least a grateful and just one. One of our greatest professional weaknesses is a lack of literary accomplishments. The classified index is a great impetus towards achieving this.

The essayist very properly recommends that—"Our teaching should be in the main from carefully selected text-books." At the same time we teachers must not overlook the fact that state boards are constantly changing their personnel, and state board questions are frequently inspired by recent journals, with the excuse that the examiner wants to see which schools are up to date. Do not forget that the first text-book purchased after leaving college is often purchased because the purchaser has just been elected to the state board. I have never done it, but have often thought it would be a good idea to immediately make a present to the newly appointed examiner, the present to be the book we are using in our school. Of course, it should be sent anonymously. One examiner recently took me to task because I taught mummification of pulps. I heartily disapprove of the practice, but, of course, I teach the theory of it and warn the student against it. This examiner overlooked the fact that our text books devote a section to the subject, and that some other examiner might be "nutty" about it, to say nothing of the possible value. "Teach them to apply to the * * * * ideas the search-light of biology, chemistry, and physics." (Black.)

The golden suggestion of the whole paper is—*"Preparation to continue his own education in the future."* Colleges have sadly neglected this in the past. Dr. Black's splendid efforts are well spent if they do nothing more than stimulate us in this respect. A large vision has been given to dental teachers. It presupposes that we have inclination and time to devote to this necessary work. Do we love dentistry that much? Have we stood on the heights until we know that service is pleasure?

Wm. Bebb, M. S., D. D. S., Chicago.

I was not invited to discuss this paper, but for two reasons I desire to do so.

First, I wish to call your attention to the stupendous task which the making of this index involves. For the reason that I have done an amount of indexing myself, I feel that I am in a position to know more about it than some of you who have not. I doubt that very many of those who have listened to Dr. Black's paper, or examined the extensive exhibit which he has brought to this meeting, or both, have any adequate conception of the amount of work involved in the preparation of this index. It may be a little clearer when I tell you that to index the News Letter and Cosmos alone occupied nearly all of my spare time for over a year, and I worked at it diligently too. Look at what he has done.

I doubt if Dr. Black ever receives the credit that is due to him for this work. While it may not be the most important single contribution to the science of dentistry, I am willing to make a positive assertion—that no single effort in the line of progress, for the past one hundred years, has entailed so much thought and labor. It is my desire to go on record as saying that I believe that the production of this index will mark an epoch in the progress of scientific dentistry.

The second point that I wish to discuss and about which Dr. Black and I have talked, but for definite reasons he has omitted from his paper, is the neces-

sity of giving the index publicity. It appeals to me that it is not too soon to begin a campaign in our literature, and otherwise, in an effort to educate the profession in the value and use of this work.

In our school we have a trained librarian, and the material is dispensed by means of the card system in general use by all libraries. Many of the students who come to us have never had a library card in their possession. They hesitate to apply for one, being fearful of displaying ignorance in going thru the procedure of securing it.

The same will be true of dentists in relation to the index, and consequently many will be slow to make use of it. They will attach a sort of "high brow" (if I may be permitted the word) spirit to it, and incline to the belief that only those versed and trained in its use will, or can, employ it. Nothing is further from the truth. Nothing could be simpler. Any dentist who can read may learn its use in a few moments.

During the progress of making this index I have been with Dr. Black sufficiently to learn that in his opinion the index will not make any immediate or profound impression upon the profession, and that it will take time to demonstrate its value.

It will require more than an idex or a library or a special course in our schools, to make reading, thinking, reasoning men out of our students. I fancy it will be a long, long time before we will see much in the way of results, but Dr. Black's work has blazed the trial to better things, and we must all do our part to carry the work forward.

I wish again to call the attention of this body, and the profession as a whole, to the obligation which we owe to Dr. Black for what he has accomplished.

Dr. Black: I should not, in view of the program still to be presented tonight, take the time of this meeting to discuss the subject further, but I do want to leave just one thought with you in connection with the scope of this work, because it is a task that is as yet only in small measure accomplished, and I am looking for some way to solve the problem for the future. I feel and always have felt that the publication of this Index should be the business of the National Dental Association and not of this body. I do not see any reason why the schools should be compelled to pay the cost of this publication.

So I want to leave with you this thought: As you have opportunity, and as this matter is to be presented to the National Dental Association at its coming meeting, show them that they at least should help with the publication of the Index, and that eventually that is the place where the responsibility should go; that the great National Dental Association should do in this connection what the American Medical Association has done in providing means and method of carrying forward a work of this kind for the medical profession.

THE POSSIBILITIES OF THE GOLD INLAY IN TOOTH RESTORATION AND PULP CONSERVATION.

By P. A. Pyper, D.D.S., Pontiac, Illinois.

(Read before the Illinois State Dental Society, May 13-16, 1919.)

IN 1893, Dr. W. V. B. Ames, then a professor of the North Western University Dental School, invited the senior class to come to his office to show them how to make a gold filling without the long and tedious process of hammering the gold into the tooth. I happened to be one of the six who composed the class who went to see that curious and mysterious way of filling teeth. He demonstrated to us that he could burnish a thin piece of pure gold to the cavity walls and then fill this cup-shaped piece of gold with solder, then cement this completed nugget into the cavity and it would stay in, resist caries, and perform all the functions of a pounded-in gold filling, lessen the fatiguing labor of the operator and punishment to the patient. Then and there began my interest in the gold inlay.

This like all other new things met with many criticisms by his associates; they accused him of being lazy and afraid to work. He made to us as a class this prophecy: "Some day these same critics will be admitting that this way of filling teeth is a success."

A little later in this same year I became associated with the late Dr. H. H. Townsend, who was probably one of the best gold operators in the state. I do not know whether I am a descendent according to the Darwin theory or not, but I did try to imitate this famous operator.

Two years later at the age of 54, he died, a broken down and worn out man. He had built many gold monuments that stand as memorials of his wonderful achievements; as those patients in whose mouths still stand these monuments relate the time it took and the torture which they had undergone for the same, the question arose in my mind—"does it pay?" Operators, physical wrecks; patients, martyrs.

Again I renewed my interest in the gold inlay as I too, had a bad physical breakdown from my imitative process; and the patients began to get wise and rebellious against the barbarous torture.

I began to experiment by putting one gold filling and one gold inlay in similar cavities in approximating teeth and watch the results of Old Father Time. He proved to my own satisfaction and that of my patients' that the gold inlay was more satisfactory than the gold filling in this way:

1. Preparation of cavity much easier and quicker.
2. No rubber dam needed.
3. Insertion of gold very much easier and filling much stronger.
4. Re-occurrence of decay around the filling less liable.

At the Illinois State Dental meeting in Bloomington, in 1903, one of the chief topics was the porcelain and gold inlay

and their wonderful possibilities. Dr. Ames said to me, "Didn't I tell you so? My prophecy has come true and the gold inlay has come to stay."

At this same meeting when the discussions were running the highest, the late Dr. G. V. Black arose and said, "I want to go on record as saying, 'There never has been, or is today, any material or process of filling teeth that excels or equals the pounded-in gold filling for the preservation of the teeth.'" Time has proven both men were right in their declarations.

"Blessed is the man whose purpose is so high that his motives are without question and his energies are a lasting human benefactor."

We have had many noble men who have given their all for humanity. Such men as the late Drs. G. V. Black, Cushing, Townsend and our living hero, Dr. C. N. Johnson, have all demonstrated to the profession and to the public, that gold fillings properly put in, or in other words, put in as they put them in, do stay in and resist decay.

The achievements of these men were not possible by but few, which made it necessary for some other method to be introduced that could be mastered by many who could not succeed or master the technic of the gold filling.

The gold inlay proved to be their goal, and then comes the lively contest and competition for the most practical scheme of making this new tooth saver.

The list of men who took part in this contest would be too long to give at this time, and many of them are among us yet and will be able to give account of their own noble deeds at some future time.

The list of schemes or processes by which to make gold inlays, is much longer than the list of men, for many of the men were just full of schemes. I do not care to enumerate all their schemes as many of them are much better dead than alive and I prefer to let them sleep in their blessed retirement.

It would also be ancient history for me to attempt to give account of all the battles that were fought between these two factions—Gold Filling men vs. Gold Inlay men. Peace has been declared and the treaties signed, which are:

1. That the old fashioned pounded-in gold filling is the best filling we have today when properly put in specific locations by qualified operators.

2. That for all other classes of cases and operators the gold inlay is the greatest human benefactor that we have today.

We are today probably living in the most critical period of dental history. The eyes of the public are upon us because somebody has told them that we, with our poor judgment and bad dentistry are responsible for practically all their ailments.

Again, they are told that we have that super-human faculty of being able to peer into that wonderful complicated cavern, the mouth, and see there hidden, beneath that bony structure of the alveolar process, myriads of micro-organisms peeping around from behind some old root or complicated entanglement of roots, the cause of their particular ailment. Now if you cannot see it some other fellow is sure he can, or at least he tells them he can,—and you are a bonehead.

It used to be, 'get your teeth fixed up and you will get well'; now it is 'get your teeth extracted and you will get well.'

Now you are up against it,—you must do something, so you wield your mysterious wand made of cold steel, and with a push— O! a pull—O! and a yell or two—O! you think you have effected a cure. Alas, the patient returns, a tooth or many teeth less, but the pain no less. Again, you wield your mysterious wand, because your operations, or some other

fellow's, have been such that you or he has left a condition that either is or may be, the cause of their physical disturbances.

Now, why? Because, first, during the gold filling age many a tooth's pulp was menaced by a large gold filling coming in too close proximity to the pulp, and the severity of the operation, with the perpetual thermal shock, caused the death of the pulp, or it was willfully destroyed to secure more anchorage for the restoration or crown, thus making another liability.

2. Because there was a ruthless extraction of one or more teeth and a devitalization of approximating teeth for the adjustment of attachments for bridge work, causing more liabilities.

Some of the accusations I have made against the gold filling operator are just as true of the gold inlay operator:

Because of the inability of his technic, applied to the particular case in hand, to get sufficient anchorage, he devitalizes to secure anchorage, or to crown. In either case he has committed what I hope will same day be declared a crime or malpractice. Namely, the unnecessary destruction of a healthy pulp.

The answer to how we can relieve ourselves of this accusation and liability is:

Perfect our technic that we can care for exposed and putrescent pulp cases in such a way that there will be no liability of causing subsequent physical disturbances.

Whether we have or have not been guilty, or if we can or cannot cure all these pathological conditions, I am going to leave for someone else to answer. I am going to try and show how to prevent some of them.

We must so perfect our mechanical technic that is will not be necessary to destroy a vital pulp to secure the necessary anchorage in individual restorations or for attachments to adjacent teeth for either stationary or removable bridge work.

In order to meet the physical forces that come on our restorations, it is necessary to have a method and material with which we can secure sufficient anchorage with the least possible sacrifice of tooth structure, also, the least possible danger to the vital pulp.

In my estimation *that method* and *material* is the *gold inlay.*

Now in order to try and prove to you the many claims for the gold inlay, I am going to show upon the screen a method and technic of cavity formation, taking wax impression, carving wax model, investing and casting of gold inlays, pinlays, and pinlocks, and their *adaptability, rigidity, attachability* and *practicability* for *tooth restoration* and *pulp conservation.*

Discussion.

Fred W. Gethro, Chicago.

The possibilities of the gold inlay in tooth restoration and pulp conservation present some very interesting and very important phases of operative and prosthetic dentistry. There is no other part of dentistry that enjoys the popularity equal to the gold inlay. There is an attraction about the process, the material used and the final results that grips the average practitioner.

Before entering into a discussion of the points in the paper I desire to express my appreciation of the hard work done and the splendid results obtained by Dr. Pyper. He is a man of rare talents and I strongly recommend that you see his clinic and observe his operations.

In addition to having great talent the essayist is an enthusiast in his subject. An enthusiastic individual will fre-

quently make claims that are sufficiently broad to admit of spirited argument, and I find in the paper some good points for argument.

The essence of the paper is that the cast gold inlay is the best material and method at our disposal today, and the author advocates the use of the gold inlay to the practical exclusion of all other filling materials. This is at complete variance with my own methods of practice. There is no best filling material except for a specific case, a definite cavity under conditions that can be very definitely stated. Gold foil has a most important place, amalgam has a very important place and the gold inlay has a very important place. I will confine my remarks to these three materials.

Dr. Pyper sums up the points of superiority of the gold inlay over the gold foil filling as follows:

1. Preparation of cavity much easier and quicker.

2. No rubber-dam needed.

3. Insertion of gold much easier and filling much stronger.

4. Recurrence of decay around the filling less liable. Let us consider these in the order given.

1. Preparation of cavity much easier and quicker. I cannot agree that the proper preparation of a cavity for an inlay is easier and quicker than for gold foil. If there is a difference it favors the preparation for gold foil. Let us get down to a definite basis for discussion. Most of our filling operations are on the back teeth and fully ninety per cent. of these are proximo-occlusal cavities. Let us take, for our examples, mesio-occlusal cavities in upper first molars and prepare three typical cavities in three similar teeth, one for gold foil, one for gold inlay and one for an amalgam filling. What difference would we have in these three cavities? Practically none. If these cavities have been properly prepared you would have to look very closely to determine which was for gold foil or amalgam or inlay. There should be only minor differences. The one prepared for the gold inlay would require a little more time and care to see that there were slightly diverging walls and no undercuts to prevent the withdrawal of the wax model without the slightest distortion.

2. No rubber-dam needed. The final preparation of all cavities should be made with the rubber-dam in place. I admit there are some objectionable features in the use of the dam. These objections are not all from the patient, for a good share originates from the dentist. Why? Because most of us make hard work by trying to place the rubber-dam where the conditions absolutely preclude its successful adjustment. Broad contacts on fillings or crowns, faulty rough margins, beginnings of caries and other similar conditions make the successful application of the dam practically impossible. No capable operator can possibly question the use of the rubber-dam in the treatment of teeth, and its use in most cases of ordinary gold filling is an advantage rather than a disadvantage.

3. Insertion of gold much easier and filling much stronger. I admit cementing an inlay is much easier and apparently quicker for both patient and operator, but do not fool yourself so far as time is concerned. It requires much more time to make and place an inlay in this typical cavity than a gold foil filling. Most cavities of this class require separation because a good wax model cannot be made unless the necessary separation is obtained. At the second sitting the cavity is usually prepared and the wax model obtained. The inlay is set at the third and polished at the fourth. Compare this with the gold foil filling under similar conditions. See the advantages of gold foil filling. 1st. Cavity can be

practically completed before rubber-dam is placed. 2nd. After dam is in position cavity is completed and separation gained while filling process is going on. 3rd. Finishing can be completed at same sitting. Compare this with the three or four appointments usually necessary for a gold inlay.

Most of us prefer to see a patient for four short sittings of approximately one-half hour each for a gold inlay to one sitting of an hour for a gold foil filling, notwithstanding the gold inlay operation may have consumed one hundred per cent more time. And yet most of us claim to be very busy—every minute taken. If we could have an efficiency expert check us up on our methods, many of us would find much lost time due to lack of system.

I believe system and efficient assistance would save fifty per cent of the operator's time in the average dental office. Dr. Pyper also says the gold inlay is a stronger filling than the foil. Not if the gold foil is properly condensed.

4. Recurrence of decay around the inlay filling less liable. This is not true if we are comparing good gold inlays with good foil fillings. A good operator, equally capable of placing an inlay and condensing gold foil will make a gold filling so superior to the inlay that they cannot be compared. An ordinary or a poor operator with equal ability for both types of filling will do much better with the gold inlay. All inlays are defective fillings and we depend on the cement to fill in the deficiencies. How long the cement will fulfill this requirement depends on the varying conditions. For a good operator I should say that the gold inlay should only be used where gold foil or amalgam is contra-indicated, because both of these fillings in the typical ordinary cavities are far superior to the inlay in good margins and this is the all important thing that we should consider. All three materials can be perfectly contoured, all have the strength necessary to withstand the stress of mastication and prevent undue wear. It is almost wholly a question of good margins—margins that hermetically seal. Where we need the gold inlay the most, it is most deficient. I refer to mesio-disto-occlusal fillings in bicuspids and molars, especially where the proximal cavities extend deeply under the free margin of the gums. These gingival margins will be defective in spite of our best efforts.

The principles of gold foil filling are so definite and so clearly given in our textbooks that there is no reason for any dentist not knowing how to successfully use this material. There are no secrets about the building of gold foil fillings. I admit that they are a strain on the operator, but I cannot see that this is a just reason for an operator failing to do them. He should operate fewer hours and receive greater compensation.

I deplore the fact that operators are losing their skill with the gold pluggers.

In order to test the skill of our senior class last Monday and Tuesday we conducted what might be termed a State Board examination requiring every member of the class to place a proximo-occlusal gold foil filling, using non-cohesive gold in the gingival third. I am not here to praise those boys, but I can honestly say that we had some beautiful fillings and these from students having had only a very limited experience in building gold. I cite these to refute the statement that only a few operators can master the difficulties of gold foil building.

I cannot pass these materials without saying something more definite about amalgam. The profession, as a whole, has no appreciation of the value of this material as a saver of teeth. Amalgam

in many cases is a far better filling than the best inlay ever made. The reasons why amalgam is not used are many. I want to refer to a very few. 1. Small fees—all the fault of the dental profession. 2. Color. The color is, of course, an objection, but for a great majority of the cavities in the back teeth this objection is not an important one.

The prejudices of the public are very important factors. I need only mention a few of the very strong prejudices held by the laity. I regret to say that these objections are not refuted by the profession. They believe it is a poor filling from every point of view.

1st. Because it will not last long.

2nd. Because it will discolor the teeth.

3d. Because it is injurious to the health by poisoning the system.

4th. Because it is cheap and they reason that nothing cheap can be good.

All of these are wrong. I cannot take time to go into detail but here is the real answer.

If we could have an amalgam invented made largely, if not all, of gold, and that material could be made into fillings exactly the same as our present amalgam, I predict that the profession would go wild over this new material and use it practically to the exclusion of all other materials. Why? Not because it would be a better material than the present amalgam, but because it was gold.

The last point I will discuss is the strongest in the paper. Dr. Pyper refers to the use of inlays for both fillings and attachments for substitutes so as to preserve the life of the pulp. Too much emphasis cannot be attached to this part of the paper. The preservation of the pulp is the all important consideration and everything else must remain secondary to it. A healthy pulp within the tooth is the only sure safeguard against future trouble. I agree with the essayist that the destruction of a pulp to assist in anchorage for a filling or inlay is little short of a crime.

In closing I desire to refer very briefly to a few of the important steps to be observed in making gold inlays:

1. Space and separation must usually be obtained prior to obtaining a wax model. Gutta-percha is frequently the ideal material for this purpose.

2. Proper cavity preparation.

3. Force wax into all parts of cavity with thumb. Do not permit patient to bite into wax to establish occlusion. In trimming wax use warm instrument to dry wax against margins.

Use sharp right angled explorer to remove wax.

Insert wax second time with cavity dry.

In making investment weigh your ingredients so that the same results will be obtained every time.

Never let flame come in direct contact with investment.

Cast with investment at room temperature.

Use gold of known purity; no scraps.

Heat gold quickly; do not burn.

Examine all castings with magnifying glass to determine the presence of small globules of gold due to presence of gas or air bubbles in investment. These globules of gold are the greatest factor in the misfit of inlays.

E. F. Hartzell, Springfield.

Dr. Pyper has just given us the details of a technic which should be an inspiration and help to every one who has had the privilege of listening to or reading the paper.

Many men advocate the direct method of moulding and carving the wax models, and others use the indirect method. The steps just outlined seem to combine both ways and seem to be a conservation of

time and energy, which is so essential in these busy days. More care must be used in cavity preparation, in order to conserve the pulp, and thereby eliminate some of the sources of focal infection, and thus play our part in the great healing art. Greater care and attention must be paid to the proper carving of cusps and sulci, so that nature may be better reproduced and less damage done to the delicate gum septum, and this particular danger towards the beginning of pyorrhea alveolaris eliminated.

Perfect or nearly perfect margins seem to be possible with no chance of failure, and it is here where so many failures are made.

Dr. Pyper, closing: I only wish that those who took part in this discussio. had fought me harder, as I would like to fight them back, but Dr. Gethro and I agreed absolutely when I said that a gold filling was the best filling we have today. The technic of the gold inlay has been hard to master by many. There are men who have mastered the technic and are making successful gold inlays, but there are lots of others who have not mastered the technic of the gold inlay, and many also who do not make good foil fillings. Recurrence of decay will occur much quicker around a defective gold filling than around a gold inlay. It is for that nsuccessful gold filling and gold inlay operator, that I claim can by this technic, succeed in making successful tooth saving operations. That was the point I tried to make, otherwise Dr. Gethro and I agree with the exception of the time required for the operations.

Dr. Gethro has not caught the full sense of the technic. The technic is simplified by paralleling the walls, so that you know the decay is removed and you do not have to cut out the under-cuts. There is a conservation of time by the technic I have described. As to other points we do not differ very much. Time is the essential factor.

I agree with Dr. Gethro as to amalgam fillings, on account of simplicity of technic and for monetary reasons. Amalgam fillings are serving more people today than any other filling material we have to deal with. The average gold operator, compared with the average gold inlay man will make better and more successful gold inlays than he will successful gold fillings. That is my contention. We do not differ very much on that.

I do not know that I can add anything more. I wish you would go home and try out the gold inlay in the manner I have described.

STANDARDIZED TECHNIC IN DENTURE CONSTRUCTION.

By William A. Giffen, D. D. S., Detroit, Mich.

(Read before the Sixty-third Annual Meeting of the Michigan State Dental Society, at Detroit, April 7-12, 1919.)

THE general public is willing to pay for superior service in denture construction, which after preventive dentistry is the most important branch of our art.

Many more teeth are being condemned than ever before. The fallacy of long fixed bridge-work has been demonstrated. The people already wearing dentures are rapidly learning that much greater efficiency can be obtained under modern methods of denture construction than ever before, consequently the demand for full and partial dentures is growing so fast that dentists all over this country who construct dentures at all, are being forced to either refer their denture cases to the specialist or equip themselves to do this work properly.

It has ceased to be a question with a large percentage of patients as to how much the fee will be, but how good and efficient can the denture be made. In fact the fee question is only limited by our ability to prove to our patients that we are giving them a better class of service than we are getting paid for.

A systematized technic which will give definite results should be the aim of all who construct dentures.

The Prosthodontia Section of The Detroit Dental Clinic Club has been practicing and demonstrating a technic for several years, which the writer systemized ten years ago.

This method of procedure is being improved and refined each year. The first step in this method is to make study models of each case as an aid to making a proper diagnosis of the requirements. This furnishes us with the opportunity of becoming familiar with the idiosyncracies of the patient. (They all have one or more). We can better estimate the difficulties to overcome. It also demonstrates to the patient that you are giving the case careful consideration and helps to establish the confidence and co-operation of the patient.

Study models are indispensable in those abnormal cases where it is necessary to resort to surgical interference in order to make suitable foundation for dentures. This may mean the removal of abnormally placed teeth, reduction of connective and mucous tissue which has resulted from unequal resorption of the alveolar ridge, or the removal of portions of the alveolar ridge itself.

It is a great pity so many people with unsightly dentures, made over malformed jaws are forced to go for years mingling in the society of their friends and acquaintances painfully conscious that they have an ugly mouth, for the simple reason that the family dentist did not know or neglected to correct the deformity by surgical means when the dentures were constructed.

The time is rapidly passing when the dentist cannot afford to sacrifice efficiency in dentures as well as the personal ap-

pearance of the patient thru ignorance. Someone will inform the patient that an injustice has been done them, as the unsightly condition might have been greatly improved instead of being made more conspicuous. The study models can also be utilized for the purpose of making individual trays which will require the minimum amount of material to make a correct impression.

A correct or test impression must possess the following qualifications:

First: It must be properly seated with the strain on the hard and soft tissues equalized as nearly as possible. When stress is applied to the impression it should not rock or slip.

Second: It must be the proper length in order that it will not interfere with the pharangeal muscles during the act of swallowing or coughing, nor must it be so short that it does not pass to the distal edge of the hard palate, thereby having adhesion broken when stress is applied at the anterior region.

Third: The rim of impression should be adapted as perfectly as possible to the labial and buccal aspect of the ridge and extend as far over the ridge as possible without interfering with or placing undue strain on the attachments of muscles to maxilla in order to take full advantage of all retention in a given case.

For the lower jaw, the same principles must be followed, and in order to get the best adaptation, care must be exercised so there will be no interference with muscle attachments, especially of those attached to the mylo-hyoid and external oblique ridges.

Dr. J. W. Greene was the first to classify these principles of impression making, and to originate a technic which would obtain these principles, and which could be proved by testing the impressions in the mouth.

The writer has for ten years practiced this technic and is absolutely convinced that it is the most scientific, accurate method yet devised. Further that it is the most agreeable method from the patient's standpoint.

I have never known of a man who acquired this technic (which is very simple but requires practice) to give it up in favor of another method. There is no reason, however, why every dentist should not be able to use a technic that will enable him to obtain accurate results. It really does not make much difference whether in the case of two or more operators, the technic is the same in every minor detail, so long as it is sufficiently definite to be certain that they will arrive at the same accurate result.

"MODELS."

The model technic used by the Prosthodontia Section of The Detroit Dental Clinic Club is as follows: Select from the Greene ready-made, non-changeable, approximate metal models, an upper metal model that will approximately fit the upper impression, and a lower metal model that will approximately fit the lower impression. A sufficient amount of plaster to cover the inside of each impression and the ridge of each metal model is now mixed and placed in position, the upper metal model is gently pressed to position in the upper impression, and the lower metal model pressed into the lower impression, and the excess of plaster which has been squeezed out around the edges wiped off. When the plaster has set, the impressions should be stripped off and models trimmed, being careful to leave the shelf portion which clearly defines the edge of the impression.

You now have models which are 96% metal, with a thin film of plaster to cover them. No model can be made that is less changeable, and they will not warp or break and will stand a great deal of

abuse. There is no possibility of squeezing them out of shape by careless packing, flasking, or vulcanizing, and any kind of metal base plate can be swaged over them perfectly in a rubber block swager.

We use Kerr's "Snow White" plaster for vulcanite work, and "Weinstein's Stone" for aluminum, gold and platinum work. The writer would also suggest at this point that the only safe way to make a cast metal base plate is to make two models for each case, cast the base plate on one model and then swage it over the other model to correct any warping or change in shape which may have taken place during crystallization of the metal.

Our technic for swagging trial or bite plates of soft metal over the models with rubber block swagger and building on wax occluding rims for taking bite, provides the most accurate test for measuring the relation of the jaws to each other. They fit as accurately as the finished denture will fit, and the heat of the mouth will not cause them to soften and bend out of shape. They will stay in position, they require the minimum amount of wax to take measurements, and the patient will not object or become impatient while you are building on or trimming for feature restoration.

When the bite has been taken and the face bow attached, they are taken out of the mouth and placed on the models and the models attached to the articulator. After the condyle path has been established, and the median and lip line marked, they are ready for placing the teeth by simply cutting out the wax rims in sections as the teeth are set up. The metal bite plates take the place of the wax base plates. This is also of great advantage; they protect the models from getting daubed up with hot wax; they are exactly the same thickness that the roof of the finished plate is to be, and the surface shows any ridges or irregularities the roof of the mouth may have, consequently the plate will have a more natural feeling to the tongue. The plate will require the minimum amount of polishing and will have the maximum amount of strength in the roof with the minimum amount of rubber.

We still use the Snow face bow. It is an accurate method for getting the correct relation of the occluding rims to the condyles of the mandible and transferring same to the articulator. Any of the so-called anatomical articulators are all right from a practical standpoint, provided you use the mouth itself for the final adjustment of the teeth for the reason that even the Gysi Adaptable Articulator does not make allowance for the difference in the relation of the dentures between the position of rest, and the position when stress of mastication is applied upon them, as there is a certain amount of resiliency in the soft tissues covering the bone upon which the dentures rest.

I wish at this time to say a few words about the Hall Automatic Anatomic Articulator, the invention of Dr. Rupert E. Hall, of Chicago. It looked good to me the first time I saw Dr. Hall demonstrate with it, which was at the National Dental Association meeting at Rochester several years ago. Great claims for its efficiency have been made for it by Dr. Hall and his friends, but I was unable to obtain one of the instruments until about two months ago on account of the fact that it was not refined sufficiently to be manufactured for the profession. The articulator is now on the market, and I have been using it for several weeks. It will do anything any other articulator will do. In addition it is an instrument of precision which makes it possible to remove the inaccuracies which creep in during the process of waxing, flasking, and vulcanizing. It eliminates all interference of mandibular movement from

the position of rest to the position of masticatory stress, teeth of any cusp angle and any degree and inclination of overbite desired can be used. In other words to quote from Dr. Hall, the arrangement of the teeth and the planes produced by the articulator provide the guides by which the movements of the jaw are made efficient in the perfect restoration of the masticatory function.

My limited experience with it leads me to believe that it will increase the efficiency of full upper and lower dentures very much.

The selection of artificial teeth is a very important phase of denture construction, one which the Prosthodontia Section of The Detroit Dental Clinic Club has developed to its highest degree of perfection from a practical standpoint. I take great pleasure in commending the work of Dr. P. C. Lowery who is the man responsible for the development of this important step.

The truest economy and the surest way to success is to throw away any method which produces an inferior article the minute a better method is discovered. This policy is what is making the work of The Detroit Dental Clinic Club worth while, and I am only sorry that every dentist cannot be imbued with this same policy.

I wish to quote a few lines from my discussion of Dr. Williams work at the National Dental Association meeting four years ago.

"I accept everything the Doctor has to offer in relation to his system. It is truly revolutionary as it eliminates guess work almost entirely, the teeth being the most perfect representations of natural teeth ever produced. The Doctor has referred to the mistakes of nature, which may at least be compromised in the selection of teeth of a different form from that of natural teeth, in order to overcome the lack of harmony which previously existed. We should always bear this fact in mind, as frequently we may change the form of the dental arch and obtain a more harmonious result.

I have one criticism to make of the Trubyte teeth. It is my opinion that the Doctor in his zeal to imitate natural teeth has made the error that other designers of artificial teeth have made, viz: the bucco-lingual diameter of the lower molars is too great for the majority of cases. In a large percentage of cases the lower molars are lost long before the patient wears dentures. The tongue having nothing to confine it laterally becomes wider in this region, so that when molars as wide bucco-lingually as the natural molars were are placed in a lower denture, there is not room for the tongue.

This is a very serious fault in a lower denture. I know that we have always been taught that we should select broad molars so we may have more masticating surface. This I believe to be a fallacy for the reason that a person has not as much power behind a denture as their natural teeth, and if the lower molars were, say a milimeter, narrower than the natural molars, it would increase their efficiency. However, a little grinding and polishing will remedy this fault."

The temperamental or guess system was practiced because we had nothing better, so the best guesser turned out the best Prosthetic restorations. It is a mistake to believe that Nature always produces teeth in harmony with face and feature.

Those who believe in the temperamental theory always assume that when a man and woman of opposite temperaments marry, the children will be a blend of two temperaments. This may happen occasionally, but more frequently the children possess the most characteristic features of both parents. In other words, one child may inherit the general facial peculiarities of the father and the complexion, color of eyes and hair and teeth

from the mother. In another child these conditions may be reversed.

Again to follow the illogical arguments of the advocate of the temperamental theory, people of the nervous temperament should always be distinguished by greater intellectual achievements and brain power generally, but the fact remains that all forms of faces and physical characteristics are included among the ablest and most intellectual people of the world.

We know that the three typal forms of teeth exist in all races, that it is Nature's secret design in human teeth, so it is possible to beat her in her own work, for Nature working more or less blindly makes many mistakes while we, working intelligently, can avoid these mistakes.

Therefore it would be very unwise to adopt a system of artificial teeth on the assumption that all natural teeth are in harmony with the organism, or to conclude that in edentulous cases no improvement over the natural teeth which the patient had is ever possible.

The aim in designing artificial teeth should always be to maintain character in the tooth by keeping its typal or class features dominant.

The most uninteresting and unattractive tooth is one in which the characteristics of all three primary types have become so blended that it has no distinction. The problem of restoring efficiency in mastication with artificial teeth is an engineering problem, which has been greatly simplified by that greatest of all dental engineers, Prof. Gysi, when he worked out with such definite precision the antagonizating surfaces of the Trubyte teeth.

In conclusion I would say there is no reason why we should not endeavor to set the standard of Prosthetic Dentistry so far above the position it has hitherto occupied as to make it impossible in the future for any self-respecting dentist to continue working in an old haphazard guess method way.

The writer has realized for some years that no one man can convince the dental profession that any technic is the one best way to construct dentures, as you will find as many methods of doing this work as there are experts in this audience, so the only way to settle this question was to get the experts of the country to organize themselves into a society to thrash out the difference of opinions, and adopt as a standard technic the methods which the majority of its members decide to be the most simple, practical, and efficient.

The society has been organized and is known as the National Society of (Denture) Prosthetists."

THE JOURNAL of the NATIONAL DENTAL ASSOCIATION

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Editor and General Manager,
OTTO U. KING, D. D. S., 127 N. Dearborn St., Chicago, Illinois
Associate Editors,
THOMAS P. HINMAN, D. D. S., Atlanta, Ga.
HARVEY J. BURKHART, D. D. S., Rochester, N. Y.
THOMAS B. HARTZELL, D. M. D., M. D., Minneapolis, Minn.

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VOL. 7 JANUARY, 1920 No. 1

Editorial Department.

WILLIAM WELLINGTON BELCHER.

When you have read, you carry away with you a memory of the man himself; it is as tho you had touched a loyal hand, looked into brave eyes, and made a noble friend; there is another bond on you thenceforth, binding you to life and to the love of virtue.—Robert Louis Stevenson.

William Wellington Belcher, D. D. S., editor of *Oral Hygiene*, a pioneer in free dental dispensary work and friend of the poor, is dead.

Splendid gentleman, loyal friend, true to the ideals of his profession, big, generous, sympathetic, outspoken, fearless, an inspiration to all who knew him, he was a man among men.

He served the profession of dentistry long, well and intelligently. It owes him more than it soon will learn to realize.

For many years he gave largely of his time and ability to the advancement of his calling, and his influence was pregnant for good in his beloved profession. There is not a dentist anywhere, who has not suffered an irreparable loss in his departure—but the spirit of his energies shall live forever and contribute to the welfare of dentistry.

Dr. Belcher had more warm friends in his profession than are given to but a few—and he deserved them. Of him any dentist can say: "I hope I may have as good a record to leave behind me when I am done." His life of service to his fellow men and his spirit of charity and altruism was an inspiration and a beacon light. Sad it is that he was called so young, just as he had begun to reap the benefit of his life work.

To Dr. Belcher the dental profession—yes, the whole nation—owes a debt that never can be paid. Starting with the children of Rochester, N. Y., ("God's poor," he called them) he preached the gospel of oral hygiene in every nook and corner of the land until, at last the cry was taken up, blossoming forth in free dispensaries in villages and towns. Today hardly a hamlet but has a dental clinic.

The story of Dr. Belcher's rise in his profession, of his early struggles against adverse circumstances, of his determination to achieve honor and distinction, of his philanthropy in face of self-denial, is worthy of a master pen.

It is enough to say in passing, that he worked his way thru college, overcoming the handicap of a half completed grammar school course, denying himself clothing, comfort and even food that he might win his degree.

Then, marrying, he went at last to Rochester, the city now known as the birthplace of oral hygiene in America. Starting in a small way, Dr. Belcher slowly built up a practice of enviable proportions. Then, just on the verge of monetary success, he chose instead the lonesome path of philanthropy, taking up the work that later was to mark him as a pioneer in his profession and a warrior for his fellow men.

Dr. Belcher from the first had small patience for the quack, and it was but natural he should join the Rochester Dental Society, an organization in which he became a moving force. In 1902, at a time when he was slowly forging to the front, some of the younger members of the society, including himself, insisted on the feasibility of establishing a free dispensary for poor children. Eventually a committee was named, of which Dr. Belcher was one, and in time a wealthy man was interested, with the result that the clinic became a fact.

The succeeding years were filled with trouble for the dispensary

committee, and as the obligation grew, a large part of the burden gradually was placed on the capable shoulders of Dr. Belcher. Time and again the dental society was on the point of giving in, only to carry on thru his persistence and never-say-die determination. "I've gone into this thing and I'll stay with it until we win, and we shall win," he said, and he gave so much of his time that his practice suffered and his family felt the pinch of poverty. Yet he kept on. At last he succeeded.

With the first dispensary on a firm foundation, due to donations by interested persons, Dr. Belcher's thoughts turned to the schools, it being his wish to establish clinics in the school buildings themselves. In this desire he was backed by the public and parochial school authorities, and soon two school dispensaries were in operation. The first of them was epochal. It was the first free school dental dispensary in the United States.

Again came the need of money, the Rochester Dental Society finding it hard to carry on the charity. The problem eventually was solved when Dr. Belcher started for the organization a bi-monthly magazine, the *Dental Dispensary Record*, which, originally intended to bring donations from local sources, gradually developed into a dental journal of national aspect. It was thru this publication that Dr. Belcher was able to encourage the starting of free dispensaries in other cities, and he also made frequent trips to different parts of the country, where he preached the gospel of clean teeth.

In September, 1914, Dr. Belcher succeeded the late George Edwin Hunt as editor of *Oral Hygiene*, a position he held until the time of his death. The editorship gave him the opportunity for which he had been waiting, the chance to tell every dentist in the United States, Canada, South America and even Europe of the work to be done.

In the years that followed Dr. Belcher slowly saw his dream of free dental clinics coming true. His hope had been that Rochester might lead the nation in oral hygiene, and of the establishment of an institution in the Flower City like the Forsyth Infirmary in Boston.

At last, when enmeshed in the illness which finally caused his death —sickness brought on by his untiring work—George Eastman, of Kodak fame, came to the front with an announcement of his decision to give to the school children of Rochester a dispensary costing more than half a million dollars. The work, he said, was to be entrusted to the Rochester Dental Society.

Lovingly Dr. Belcher watched the institution become a fact, lovingly he participated in the preliminary arrangements, and lovingly he helped select the director. Finally, when Mr. Eastman endowed the dispensary with a fund of one million dollars his joy was complete.

In a recent issue of *Oral Hygiene*, Dr. Belcher, in telling the story of the Rochester dental dispensaries, closed his article as follows:

"We are reaping the benefits of the work of a few unselfish men of the past, and it is only by such efforts that we shall hand down a heritage to the future generations of dentists, and they in turn shall take up the work and make the blessings of modern dentistry an accomplished fact."

Dr. Belcher was one of unselfish men.

May he rest in peace and may his memory and the memory of his deeds be graven deep in the tablets of the Hall of Fame of dentistry.

Vale!

DENTISTRY AND SCHOLASTICISM.

There never was a time when dentistry was as jealous of its attainments as at the present moment. Because of the far-reaching effects of mouth ailments the dentist has been invited into the field of general pathology to discuss conditions that a few years ago not many dentists would have attempted had they been invited and it is very possible that they would have been deemed ineligible to the discussion. By the same token his endeavors in other subjects have become co-extensive. A natural sequence has been a deepened and activated interest in educational attainment. Dentists are reading widely to fit themselves for the new epoch, schools are extending their courses and necessarily demanding better preliminary training of their registrants. Certain it is that the better dental schools are lifting their scientific courses above the plane where they were a hollow mockery to a position commanding respect. To illustrate: No school deserving the name attempts to teach physiology without a laboratory course. Men who know the subject and pedagogy recognize the impossibility of such a thing. Also schools are beginning to recognize that they have no right to present to students a non-negotiable course, a course that other than dental schools will not recognize. Schools that are integral parts of universities are being held to the same standards of entrance scholarship and of teaching as other units of those universities. The student has rights to him inalienable that the school must respect. Dentistry is sensing the aroma of scholasticism.

But in the transition there is danger. Always the coin of the realm is counterfeited. Always the counterfeit is to be repudiated. There is the danger of the "little learning," a real danger it is true only to its possessor but which aspires often to untenable places and seeks the public approval of the profession. The counterfeit, the glitter of "fool's gold" cannot have the signature of present day dental education. At this particular time when effort strenuous and sincere is being made to

place the profession where it deserves to be, it should be guarded against the charlatanism of those who would prate of themselves under titled forms or describe themselves in academic terms that taken seriously are pathetic but which we believe are looked upon generally with amusement. For instance we have in our midst an academy which is entirely devoid of academicians. We are inclined to marvel at the assumption. Should such a thing be mentioned where the well-nigh sacred lineage of the term is appreciated we wonder what the reaction would be. The profession can ill afford recognition to such a thing.

Also there is the tendency to the display of newly made, badly made entirely unnecessary terms, terms that seem to be constructed and used entirely for their sound. Neither size or sound is deemed a rhetorical asset necessarily. Doubly true is it when a simple form is entirely adequate. There is no need for the supplanation of the effective, accepted term by some monstrosity in verbal concoction. Thus ever and anon we see periclasia, periodontoclasia, apioectomy, most recent of all pediadontia, and kindred forms. The whole assortment savers of glass diamond effects; it reminds one of the oratory heard in the colored chapel of days gone by. Big words have always been the playthings of the illiterate. Extraction is always better than exodontia; resection is honored in surgery and is adequate to dental needs. Apioectomy is an atrocity than which apicoectomy is slightly better. True it has been cannonized in some medical dictionaries but the Committee on Nomenclature will explain the difficulty they have restraining the publishers from printing anything that might help sales. Periclasia makes a hollow pretense but has its roots in nothingness. So on to the end.

The Journal desires above everything to speak the findings of the profession and give to the world its pronouncements but it desires to conform to a standard that reflects credit upon its own pages and the profession. As the official mouthpiece of our national organization it wishes to present dentistry to the world with dignity and respect and in the future will employ such terms as those approved by our own commission on nomenclature.

THE SALE OF THE RELIEF FUND SEALS.

Ten thousand dentists and others have nobly responded to the appeal for the succor of our indigent members thru the sale of the Relief Fund Christmas Stamps. There are many who, thru neglect, oversight or otherwise, have not contributed to this worthy cause. If you have not already sent in your check, kindly do so immediately as it will save time and expense in writing you a personal letter.

MEMBERSHIP DUES DUE JANUARY 1, 1920.

All dues, which include the annual subscription to The Journal of the National Dental Association, are due January 1 of each year. The March Journal will not be mailed to any delinquent members. The ruling of the postoffice authorities is adamant on this proposition. Therefore, any dentist who has not already paid his state society dues for 1920 should do so immediately. The state society officers are cooperating with the National organization and will immediately upon receipt of the State dues mail the National dues to the National office.

It will be impossible for us to furnish back copies, as we are only printing enough to supply our bona fide mailing list. An immediate compliance with this notice will save the delinquent member a great deal of confusion and misunderstanding.

THE DENTAL PROFESSION'S TEN AIMS FOR 1920.

1. 29,000 members and 35,000 subscribers to The Journal.—Average of 18% increase in membership in every component society.

2. $78,000 in the Relief Fund with a definite plan of distribution.—Every member a contributor to this worthy cause.

3. Thru the Research Commission and otherwise encouraging the spirit of scientific research and inventive genius.—Debt on the Research Institute Building paid.

4. 6,000 in attendance at the Boston meeting and the staging of a real "Seminar Course."

5. 2,000 additional volumes added to our National library.

6. Systematic and standardized graduate and post-graduate courses inaugurated and developed.—The educational standard in every dental school raised.—The classification of State Dental Examining Boards.

7. More efficient dental service to humanity.—National Oral Hygiene Bureaus established.—More public dental clinics.—Better dental laws.—Dental Hygienists recognized in every state.

8. All scientific papers to include complete bibliography.—Revision and standardization of nomenclature.

9. The three requisites for the successful dentist: Enthusiasm, Energy and Thoroness.

10. For every dentist to have a religion of truth, law, justice, work, democracy, mercy, monogamy, science and God.

Announcements

NATIONAL DENTAL ASSOCIATION, 1920.

August.

23-24-25-26-27—Boston.

STATE SOCIETIES.

January.

Rhode Island, Providence.

March.

4-5-6—Minnesota, Minneapolis.
8-9-10-11-12-13—Texas, Dallas.
15—Oklahoma.
17-18-19—Vermont, Burlington.
22-23-24-25—Illinois, Chicago.
22-23-24-25-26-27—Kansas, Wichita.
29-30-31, April 1-2-3, South Dakota, Sioux Falls.

April.

7-8-9—Kentucky, Louisville.
12-13-14—Michigan, Detroit.
13—Alabama, Mobile.
14-15-16—West Virginia, Charleston.
19-20-21-22-23—Mississippi, Jackson.
20-21-22—Connecticut, New London.
27-28-29—Pennsylvania, Reading.

May,

Massachusetts, Boston.
North Dakota, Grand Forks.
4-5-6—Iowa, Cedar Rapids.
9-10-11—New York, Albany.
17-18-19-20-21-22—Nebraska, Lincoln.
18-19-20—Indiana.

June.

Florida, Miami.
Maryland, Baltimore.
Maine.
New Hampshire, Manchester.
New Mexico, Albuquerque.
Southern California, Los Angeles.
South Carolina, Columbia.
Utah, Provo.
9-10-11—Georgia, Atlanta.
14—Colorado, Colorado Springs.
14-15—Wyoming, Cheyenne.

July.

New Jersey.
Virginia, Old Point Comfort.
13-14-15—Wisconsin, Milwaukee.

November.

18—District of Columbia, George Washington University, Washington, D. C.
Arizona, Phoenix.

December.

2-3-4—Ohio, Columbus.
10—Delaware, Wilmington.

Dates to Be Announced.

Arkansas, Little Rock.
California State.
Idaho, Pocatello.
Louisiana, New Orleans.
Montana, Great Falls.
Missouri, Kansas City.
North Dakota, Wrightsville, Beach.
Oregon, Portland.
Tennessee, Chattanooga.
Washington, Tacoma.

KENTUCKY STATE DENTAL SOCIETY.

The next annual meeting of the Kentucky State Dental Association will be held in Louisville, April 7-8-9, 1920.

A program of unusual interest has been planned. Address all correspondence to W. M. Randall, Secy., 1035 Second St., Louisville, Ky.

VERMONT STATE DENTAL SOCIETY.

The Vermont State Dental Society will hold its next annual meeting in Burlington on Wednesday, Thursday and Friday, March 17 to 19, 1920.

PHILIP E. MELLEN, Secretary,
Middlebury, Vermont.

MICHIGAN STATE DENTAL SOCIETY.

The next meeting of the Michigan State Dental Society will be held at the Hotel Statler, Detroit, Mich., April 12, 13 and 14, 1920. The chairman of local arrangements is William H. Waller, 613 Washington Arcade, Detroit.

CLAUDE S. LARNED, Secretary,
614 Post Bldg., Battle Creek, Mich.

ANNUAL CONVENTION OF TEXAS STATE DENTAL SOCIETY.

The Texas State Dental Society will hold its 40th annual convention on March 8-13, 1920, at Dallas, Texas. The special feature of this meeting will be post-graduate class courses conducted on the "Oklahoma Plan." These classes will be conducted by the following well known men: Dr. Thomas B. Hartzell, Minneapolis, Minn.; Dr. F. Ewing Roach, Chicago, Ill.; Dr. Arthur E. Smith, Chicago, Ill.; Dr. Dayton D. Campbell, Kansas City, Mo.; Dr. T. W. Maves, Minneapolis, Minn. Other instructors may be employed.

J. G. FIFE, Secretary,
736 Wilson Bldg., Dallas, Texas.

MINNESOTA STATE DENTAL ASSOCIATION.

The thirty-seventh annual convention of the Minnesota State Dental Association will be held at the West Hotel, Minneapolis, Minn., on March 4th, 5th and 6th, 1920.

MAX E. ERNST, Secretary,
1125 Lowry Bldg., St. Paul, Minn.

CHANGE OF DATES.

The Fifty-sixth annual meeting of the Illinois State Dental Society will be held in Chicago beginning Monday, March 22, 1920, and continuing for four days. Headquarters at Congress Hotel, where sessions, clinics and exhibits will be housed.

J. P. LUTHRINGER, Secy., Peoria, Ill.

ALUMNI ASSOCIATION, WASHINGTON UNIVERSITY.

Watch for particulars in next issue concerning the home-coming of the Alumni Association of Western University School of Dentistry of St. Louis, Mo., to be held February 23rd-24th, 1920, at the College Building, 29th and Locust. A post-graduate course will be given with some of our greatest men in dentistry giving lectures, the names to be announced later. Be sure to save this date open. Everybody welcome.

PUBLICITY COMMITTEE.

FLORIDA STATE BOARD OF DENTAL EXAMINERS.

There will be a special session of the Florida State Board of Dental Examiners, January 15, 1920, at 7:30 P. M. in the office of the Secretary, Jacksonville, Fla., for the purpose of examining all qualified applicants, who may come before them at that time.

For further information address Dr. R. P. Taylor, 414-15 St. James Bldg., Jacksonville, Fla.

MISSING NUMBERS WANTED.

Vanderbilt University, School of Dentistry, wishes to complete the volumes of The Journal of the National Dental Association. The missing numbers are 1, 2 and 3 of 1914. Also Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 of 1919. It is understood that the usual price per copy will be paid. Who will help good old Vandy?

D. M. CATTELL, Chairman,
Library Board.

AMERICAN INSTITUTE OF DENTAL TEACHERS.

The next annual meeting of the American Institute of Dental Teachers will be held at Detroit, Mich., January 27, 28 and 29, 1920. Hotel Statler will be the headquarters.

A cordial invitation is extended to all persons interested in dental teaching.

DR. RUSSELL W. BUNTING, Pres.
DR. ABRAM HOFFMAN, Secy.
381 Linwood Ave., Buffalo, N. Y.

ALUMNI SOCIETY OF THE DEWEY SCHOOL OF ORTHODONTIA.

The next annual meeting of this society will be held on April 1-2-3, 1920, at the Edgewater Beach Hotel in Chicago.

The usual high standard of the meetings of this Society will be maintained. One half day will be devoted to clinics.

All interested in Orthodontia are cordially invited to attend these meetings.

GEORGE F. BURKE, Secretary.
741-45 David Whitney Bldg.
Detroit, Michigan.

MARQUETTE UNIVERSITY DENTAL ALUMNI ASSOCIATION.

The Marquette University Dental Alumni Association will hold its meeting February 11, 12, 13, 1920 in the Milwaukee Auditorium, Milwaukee, Wisconsin.

V. A. SMITH, Secy.,
755 Second St., Milwaukee, Wis.

MISSISSIPPI DENTAL ASSOCIATION.

The Mississippi Dental Association will hold its annual meeting at Jackson, April 19-23, 1920, inclusive.

W. F. BEAVERS, Secretary,
Meridian, Miss.

AMERICAN SOCIETY OF ORTHODONTISTS.

The next meeting of the American Society of Orthodontists will be held at the Edgewater Beach Hotel, Chicago, Ill., Monday, Tuesday, and Wednesday, April 5th, 6th and 7th. Those interested in Orthodontia are invited to attend.

ALUMNI SOCIETY OF THE PHILADELPHIA DENTAL COLLEGE.

The annual meeting of the Alumni Society of the Philadelphia College will be held on Wednesday, April 21, 1920, at 9 A. M. in the college building at 18th and Buttonwood Sts., Philadelphia. All members of the Alumni should note the date and arrange to be present.

FRANKLIN S. FLUCK, Pub. Com.

PREPAREDNESS LEAGUE OF AMERICAN DENTISTS FRENCH-BELGIAN RELIEF FUND.

We are glad to report the receipt of more contributions to the League fund for French and Belgian dentists who have suffered so severely from the war. As American dentists we should deem it a distinct privilege to give aid to our unfortunate brothers, for the benefits we enjoy are greater than those of any similar body of men in the whole world and our income is far in excess of any previous time.

Let us not forget that to give is but to receive and the giver is the one who becomes greatly enriched thereby. Did you ever stop to question the ownership of the worldly goods in your possession? No doubt it would require much argu-

ment to convince you that you do not own the property in your possession,—that the money you have earned by years of unremitting toil is given you to be held in trust for others. In a few years it must pass on to another link in the endless chain signified by birth and death, and will it not give you much satisfaction and comfort to know that you have transferred a due proportion of it to the welfare of your suffering brother dentists in devastated France and Belgium? There are about five hundred dentists, a good many widows and many children to be looked after. Will you not dig deep into your pockets and bring forth all you can possibly spare for this grand cause?

We earnestly urge all members of the League to rally to the cause and contribute at least one-dollar each and thereby assist in making this object the success it merits. We have appointed a commission to represent the League of Drs. George Villain, Wm. Slocum Davenport and Richard Burkhart, all of Paris. Following are letters recently received:

6 Avenue De L' Opera, Paris,
Oct. 19, 1919.

Dr. J. W. Beach,
131 Allen St.,
Buffalo, N. Y.

My dear Dr. Beach:

It gives me great pleasure to act with Drs. Villain and Burkhart on the Commission to collaborate with the Aide Confraternelle, the acceptance of which I cabled you.

It is a great personal satisfaction to know the great interest the American Dental Profession takes in this most excellent work.

The Aide Confraternelle is composed of men who stand high in the Profession who have labored during the war under most trying conditions and are now most grateful for your assistance. I might mention Dr. I. B. Davenport, my brother, is Vice-President of the Aide and was one of the Founders. Your Committee has had two meetings with the Aide and will be kept in constant touch with all of its proceedings.

As I cabled you "Funds Urgent" with the present exchange 8,665 every dollar will count. A few weeks ago the exchange was $9.13 but no doubt that side of the question will be carefully watched by you in America.

The conditions in Paris have much improved in many ways. The French dental profession has made a fine showing in Army and Hospital work and we anticipate a better recognition for them in the near future, on the line we have attained in America.

My dear President it is a privilege to be called upon to work with you, in the interest of our French Confreres who have always shown Americans every courtesy.

Very fraternally yours,
WILLIAM SLOCUM DAVENPORT.

Extract from Letter Received from Dr. Richard Burkhart, of Paris.

As Dr. Davenport writes and cabled they, Aide Confraternelle, do need money. They have now about seventeen children they are looking after and several widows, as well as receiving requests for help from many dentists. They are about as representative and active a group of French dentists as can be gotten together, are very fine men and deserving of a great deal of credit for the work they have done and are trying to do.

They give money to buy equipment to any deserving dentist or help the family of any. Sometimes they give two or three thousand francs or more but usually less. They have helped some Belgians and as far as I can see are not at all partisan, but willing to help all.

With the exchange as it now stands we can do a bigger thing by getting any available money as soon as possible.

They are planning to try and make dentists of all of the children they can, which surely is a good thing. They bring up each name at the meeting and investigate it and no money is given until voted on. If you want us personally to see each applicant or go into the matter more, let me know.

Kindly send all contributions to Dr. L. M. Waugh, 576 Fifth Ave., New York, N. Y., who is Treasurer and will acknowledge all receipts and render a strict accounting of all disbursements.

J. W. BEACH, President.

In Memoriam

Dr. William W. Belcher, Rochester, N. Y. Born at New Milford, Pennsylvania, August 27th, 1866. Son of John W. and Lois Belcher, of old Pennsylvania families. Received his first training in Washington, paying his own way by work in the private laboratories of local practitioners. Later he entered the Philadelphia Dental College and Garretson Hospital of Oral Surgery, graduating in 1889. Following one year in Rochester with Dr. J. Edw. Line, he practiced for six years in Seneca Falls, N. Y., returning to Rochester to become associated with Dr. Henry S. Miller. Within a year of this relationship he opened an office of his own, continuing in practice until the beginning of the illness that terminated in his death. From 1910 to 1913, inclusive, he edited the Rochester Dental Dispensary Record, a bi-monthly supported by the Rochester Dental Society, and largely instrumental in interesting the public spirited citizens of Rochester, and later the municipality itself, in free dental dispensaries for the children of the city's worthy poor. It was the success of this movement and the interest it aroused that resulted in the great institution founded by Mr. George Eastman. Five years ago he became editor of Oral Hygiene and thru its pages had made the dental dispensary idea common property thruout the English speaking world. He was a member of the Rochester Dental Society, the Seventh district, the New York State Society and the National Association.

He died December 4th, at his home in Rochester, the funeral ceremonies were held on the 6th and the interment made in the family plot in the cemetery at Auburn. A delegation of dentists of Auburn met the remains at the depot, six of them officiating as active pall bearers.

RESOLUTIONS

Adopted by Rochester, N. Y., Dental Society on the Death of W. W. Belcher, D. D. S.

Whereas, Dr. William W. Belcher passed from this life on Wednesday, December 3, 1919, at his home, 186 Alexander St., Rochester, N. Y.

Dr. Belcher was born at Milford, Pa., August 27, 1866. After receiving his early education he entered the Philadelphia Dental College and was graduated in 1889. On the completion of his post graduate work he located in Seneca Falls, N. Y., remaining there six years. Dr. Belcher moved to Auburn, N. Y., and was associated with Dr. Henry Tripp. In 1896 he moved to Rochester and associated himself with Dr. J. Edward Line and later with Dr. Henry Miller. After

these affiliations he began practice by himself and made a conspicuous success.

Dr. Belcher's great love and enthusiasm to provide proper dental attention for poor children appealed to him more than the material rewards of professional attainment. To this cause he devoted his untiring efforts and with other colleges he was instrumental in establishing the first free Dental Dispensary which later culminated in the present Rochester Dental Dispensary, one of the two institutions of its kind in the world.

Dr. Belcher was widely known as an editor of Dental magazines and the Dental Dispensary record conceived and edited by Dr. Belcher, proved to be a most potent factor in stimulating public interest in the subject of philanthropic dentistry. As a lecturer his ability found a most easy and natural expression.

Dr. Belcher possessed many lovable traits, a fund of humor, and good fellowship which made him a favorite companion of all who knew him.

Resolved, that we, the members of the Rochester Dental Society, do record our deep sense of loss which the dental profession and this society have sustained, and be it further

Resolved, that we extend to the family our sincere and heartfelt sympathy and that these resolutions be spread on the minutes and be published in the dental journals, and that copies be sent to the family of our departed member.

JOHN H. PARMALEE,
CHARLES J. PIERCE,
HOWARD F. LEWIS, Chairman,
Committee.

RESOLUTIONS ON THE DEATH OF DR. OTTO C. SCHMEDEMAN.

The following resolutions on the death of Dr. Otto C. Schmedeman were adopted at a meeting of the Dane County Dental Society on November 14, 1919.

Whereas, it has pleased Almighty God to take from our midst our fellow member, Dr. Otto Carl Schmedeman, in the most promising period of his career, and

Whereas, our community has thereby lost a citizen held in highest honor and esteem, our society and profession a skilled and zealous member and the family a kind and devoted husband and father; therefore, be it

Resolved, that we, the members of the Dane County Dental Society, do hereby express our sorrow at the loss we have all sustained and our sincere and heartfelt sympathy to the family of our late brother in their hour of great bereavement; and be it further

Resolved, That in tribute to his memory a page on our minute book be set aside and a copy of these resolutions be spread thereon, and that a copy thereof be sent to his family.

F. M. LIBBY,
D. P. WHEELER,
C. F. RODOLF,
Committee.

RESOLUTIONS

Of the Jefferson County Dental Society and of the Kentucky State Dental Association Upon the Death of Dr. Edw. M. Kettig.

Whereas, God, the Allpowerful Ruler of the destiny of man, has in His unfathomable wisdom, called from among us a devoted husband, affectionate father, loyal friend, esteemable citizen and a professional man of rare qualities in the person of Dr. Edw. M. Kettig, and,

Whereas, by his untimely death the Jefferson County Dental Society and the Kentucky State Dental Association suffers the irreparable loss of one of its charter members, as well as one of its most ardent supporters, therefore be it

Resolved, that, thru the death of Dr. Edw. M. Kettig, a favorite voice in our

councils is forever silenced and our society will be impoverished by the absence of his jovial and lovable spirit, his living example of fairness, honesty, industry and high professional indeals,

That, while he was ever a sustaining friend to every younger professional brother, he always proved a competent companion of the most advanced in his chosen work. Be it further

Resolved, that the Jefferson County Dental Society and the Kentucky State Dental Association is moved to profound appreciation of his untiring labors for his profession, as a member of the faculty of the Louisville College of Dentistry for many years, as a frequent contributor to the advancement of dental science by paper, discussion and clinic, and as an efficient and faithful official,

That the whole dental profession is the richer for his having served it with so useful a career, and be it further

Resolved, that the Jefferson County Dental Society and the Kentucky State Dental Association share with the bereaved wife and son their unspeakable burden of sorrow, and convey to them the sincere condolence and sympathy of its entire membership in the hope that the consciousness may be theirs that the useful life of their departed has blessed all humanity and therefore is rewarded with eternal joy and bliss.

That a page in the society records be set aside to contain these resolutions and be dedicated to the sacred memory of our departed member, a copy sent to the bereaved wife and son and supplied the daily press and The Journal of the National Dental Association for publication.

Signed:

EXECUTIVE COUNCIL
Of the Jeffeson County Dental Society.

BOARD OF TRUSTEES
Of the Kentucky State Dental Association.